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PARTICIPATIVE BUDGETING AS A COMMUNICATION PROCESS: A MODEL AND--ETC(U)

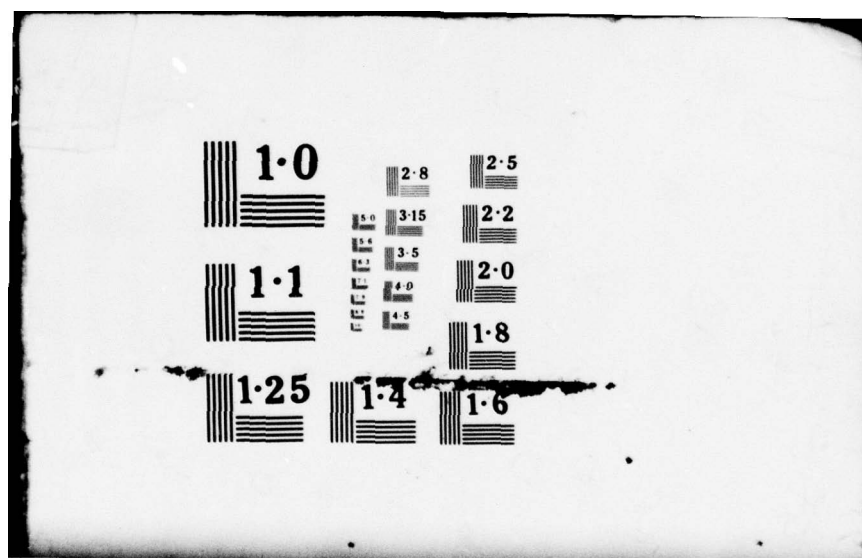
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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) PARTICIPATIVE BUDGETING AS A COMMUNICATIONS PROCESS; A MODEL & EXPERIMENT		5. TYPE OF REPORT & PERIOD COVERED THESIS
7. AUTHOR(s) HARR, DAVID JAMES		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS UNIV. OF WISCONSIN - MADISON		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS CODE 031 NAVAL POSTGRADUATE SCHOOL MONTEREY, CALIFORNIA, 93940		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) <b>LEVEL</b>		12. REPORT DATE JAN 78
		13. NUMBER OF PAGES 223
		15. SECURITY CLASS. (of this report) UNCLASS
16. DISTRIBUTION STATEMENT (of this Report) APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED		16a. DECLASSIFICATION/DOWNGRADING SCHEDULE
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) BUDGETING, COMMUNICATION PROCESS, PARTICIPATIVE BUDGETING		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) NONE		

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② Doctoral thesis /

⑥  
PARTICIPATIVE BUDGETING AS  
A COMMUNICATION PROCESS:  
A MODEL AND EXPERIMENT /

BY

⑩ DAVID JAMES HARR

A thesis submitted in partial fulfillment of the  
requirements for the degree of

Doctor of Philosophy  
(Business)

at the

UNIVERSITY OF WISCONSIN-MADISON

⑪ Jan 1978

⑫ 232p.

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## ACKNOWLEDGEMENTS

The opportunity to conduct this research was provided me by the U.S. Navy. I sincerely appreciate my allowed participation in the Navy Postgraduate Education Program, and hope that this experience will benefit both the service and myself in the near future.

The successful completion of this research is due to the many timely contributions, many of them made unknowingly, of various faculty and staff members of the University of Wisconsin-Madison. Chief among these individuals include the members of my Dissertation Committee. The many helpful suggestions and expert guidance provided by Professor Werner G. Frank, my Committee Chairman, could only have resulted from many hours of his efforts in analyzing the volume of papers and drafts leading to the report. The comments of Professor Ernest I. Hanson enabled sharp improvements in successive drafts of the report. Professor Winston L. Brembeck provided valuable suggestions to properly relate this report to the vast field of Communication research and to refine the presentation of this study. Statistical matters and the presentation of the analysis of results were greatly aided by Professor James C. Hickman. Professor Ramon J. Aldag provided valuable insights to relate this study to research to the field of Organizational Behavior. A major positive influence in the early development of this research stemmed from the efforts of Professor Steven H. Chaffee. I hope that I can show my appreciation for his efforts and those of my committee members by beginning to emulate their excellence in the future.



The actual administration of the experimental sessions in this research was the responsibility of Ms. Susan A. Peters. The results of the study are thus in large part her work. Her capable performance in the president role bodes well for her future success as a manager.

The tireless efforts of Ms. Jean M. Wilson produced an excellently typed manuscript. Her mastery of the style manuals and cheerful response to my unreasonable deadlines ensured that no administrative detail slowed the progress of the report.

Finally, the patience shown by my wife, Lynn, daughter, Jennifer, and son, David, was admirable and greatly appreciated in light of the seemingly endless period required to complete my doctoral program. I hope that I can begin to make up in the future for the opportunities foregone in the past.

Madison, Wisconsin  
January, 1978

David J. Harr  
Lieutenant Commander  
Supply Corps  
U.S. Navy

## CHAPTER ONE

### INTRODUCTION TO THE STUDY

#### Background for the Study

According to Hopwood, budgeting now occupies a central position in the design and operation of most management accounting systems.<sup>1</sup>

Further, he notes:

Budgeting is being seen in much wider terms than a mere technique and procedure. It is being seen as part of a process which both influences, and in turn is influenced by, managerial and employee attitudes and behaviors. The need for . . . the participation of the lower members of the organization is viewed as a vital feature of these more modern approaches to budgeting.<sup>2</sup>

This subordinate participation in the budgeting process is the general concern of this study.

Subordinate participation in the budgeting process is a complex phenomenon and its operation and effects are not well developed in the accounting literature. DeCoster argues that a host of assumed operational and motivational benefits underly the use of this participative budgeting process.<sup>3</sup> A major assumption is that participation leads to increased subordinate morale and more favorable attitudes toward the budget which, in turn, leads to increased aspiration levels and moti-

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<sup>1</sup>Anthony Hopwood, Accounting and Human Behavior (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1976), p. 39.

<sup>2</sup>Ibid., pp. 73-74.

<sup>3</sup>Don T. DeCoster, "An Intuitive Framework for Empirical Research in Participative Budgeting," paper presented to Accounting Research Convocation, University of Alabama (University, Alabama, 1975), pp. 7-10.

vation for improved performance. In his view, this assumption cannot be accepted without further examination.<sup>4</sup> Hopwood notes there have been few systematic investigations specifically concerned with participation in the budgetary process.<sup>5</sup>

#### Justification for the Study

The observations of DeCoster and Hopwood are taken as justification for the present study. Given the central role of the budgeting process and the assumed operational and motivational benefits associated with subordinate participation in this process on the one hand, and the few systematic investigations concerning the operation and effects of participation in budgeting on the other, research in this area is considered particularly appropriate. A systematic approach to the investigation of participative budgeting may provide evidence to substantiate or refute its assumed benefits, which ultimately may have important implications for organizations considering the use of such a process for budget development.

#### Purpose of the Study

✓ The purpose of this study is to develop a general model of participative budgeting and to initiate a systematic exploration of its operation and effects. The general model is developed to operate in any organizational setting. However, Hopwood notes that both managers and employees influence, and are influenced by, the budget and the assumptions underlying the rationale for participative budgeting suggest a broad range of interwoven questions. Thus the initial exploration of

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<sup>4</sup>Ibid., p. 20. <sup>5</sup>Hopwood, op. cit., p. 74.

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the model operation concerns only the upper levels of management and the investigation of its effects concern only the questions about the linkage between subordinate manager participation in the budgeting process and more favorable attitudes toward the budget.

#### Major Questions

The assumed linkage between subordinate participation in the budgeting process and more favorable attitudes toward the budget raises two major questions: first, whether more favorable attitudes actually result from participation; and secondly, if they do result, how these attitudes emerge from the participation process. The first question concerns whether participation produces attitudinal results different from the lack of such participation. The second question concerns whether participation involves other identifiable results that relate to the emergence of these attitudes. The approach to these questions is based on research concerning the communication process and its effects.

#### The Approach of the Study

A participative budgeting model is developed based on an interactive communication process involving top management and subordinates in the development of the budget. The model is limited to the planning function and is comprised of three phases. These phases are: orientation, in which the interactive communication involves discussion of the facts of the budgeting situation; evaluation, in which alternative ideas, opinions and suggestions are discussed; and joint decision making, in which consensus is reached on the final budget. This model is then used in a laboratory setting to examine the question of whether participation, defined as the allowed interactive communication, leads to favorable



attitudes of subordinates toward the budget. Some other effects of this interactive communication are also utilized as a means to determine how these favorable attitudes arise in the participative budgeting process.

This approach to the investigation of participative budgeting is unique in that it is the first attempt to explicitly consider both the operation of the communication process and its effects in addressing participative budgeting questions. The approach draws on the considerable support for a communication process view suggested by prior research to provide the missing explanatory link between the activity of participation and its effects. Because the communication process is a complex one, attention to the operation of the process is limited to its mechanical aspects while major emphasis is placed on its effects.

#### Report of the Study

The study is reported in the next five chapters. In these chapters a basis for the communication process approach is identified and a participative budgeting model is developed. Then an experiment designed to assess hypothesized participation-attitude linkages in terms of the operation of the model is described and the results of the experiment are reported. The major conclusions, implications, limitations, and extensions of the study are then discussed.

In chapter two the prior participation-related research is examined. The review identifies and discusses two major approaches to viewing participation; subordinate influence on decisions, and shared control in decision making between manager and subordinates. The discussion indicates that this research strongly suggests a communication process approach, but no study has rigorously examined both the activity of participation and its effects in terms of such a process.

In chapter three the participative budgeting model is developed. Then research from communication theory is used in conjunction with participative budgeting research to hypothesize that subordinate attitudes of satisfaction, commitment and perceived correctness toward the budget result from participative budgeting. A communication effects model is discussed as the basis to hypothesize that subordinate understanding, accuracy, congruency and agreement comprise the means through which these more favorable attitudes result.

The design and methodology of an experiment to test the hypotheses are described in chapter four. A laboratory simulation of a budgeting situation based on a management game is described and related to the model of the study. Particular attention is given to internal validity considerations to permit an unambiguous determination of whether the communication effects and subordinate attitudes resulted from the experimental treatment of interactive communication.

The statistical methodology and results of the analysis are discussed in chapter five. Analysis of variance procedures are used to determine that the communication effects of increased subordinate accuracy, congruency, and agreement and the favorable attitude of perceived correctness resulted from the interactive communication in the experiment. Correlation analysis shows that many of the communication effects are significantly related to the attitudes toward the budget.

In chapter six the research is summarized. Then conclusions and implications from the experimental findings are related to the prior participation research and establish the viability of the communication process approach to further study of participating budgeting questions. The limitations of the research are noted, and

extentions of the study are suggested to both budgeting and other areas of accounting research.

The appendix provides the procedures and instruments used in the experimental sessions to conclude the report of this study.

## CHAPTER TWO

### THE BASIS FOR A COMMUNICATION

#### PROCESS APPROACH

Much of the conceptual basis for studies of the participative budgeting process stem from the research concerning subordinate participation in the decision making process. The purpose of this chapter is to demonstrate that both this prior research in participation and in participative budgeting suggest the viability of a communication process approach to the systematic investigation of the participative budgeting process.

In the discussion below, the communication process is considered the transmission of information from a source to a receiver through a channel linking the source with the receiver.<sup>1</sup> Four major elements of the process; the source, the receiver, the channel, and the information transmitted can interact to make communication a complex phenomenon. Consequently the specific relationships among these elements suggested by this research are identified in the analysis.

#### Participation Research

The examination of the participation research begins with its origins to show that the early research strongly suggests the use of a communication process approach. Subsequent studies provide additional

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<sup>1</sup> Raymond J. Chambers, Accounting, Evaluation and Economic Behavior (Houston: Scholars Book Co., 1974), p. 166.



support and are classified into two major approaches that deal with subordinate involvement in the decision making process; influence by the subordinates on the decision made, and the sharing of control of the decision process by the manager with subordinates. The studies comprising the influence approach have at times apparently assessed the effects of a communication process but no study has explicitly tied the operation of such a process to the obtained results. The studies classified under the shared control approach suggest the use of alternative communication processes and varying information exchange as the means to the sharing of decision making control. Again, however, no study has systematically linked the alternative processes and variations in information exchanged to the observed results.

#### Early Participation Research

##### Lewin Studies

The genesis of research concerning participation and its effects is generally traced to Lewin.<sup>2</sup> Hampton, Summer, and Weber state:

Since the imaginative and influential research of Lewin most students of organizational behavior have come to accept that a person's participation in setting a goal increases the likelihood that he will act to ensure that the goal is met. Presumably when the follower has participated in determining what is to be done, he should understand and agree that a certain course of action is necessary and proper.<sup>3</sup>

Of interest is that the results of participation are presumed to occur

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<sup>2</sup>Kurt Lewin, Resolving Social Conflicts; Selected Papers on Group Dynamics (New York: Harper & Row, 1948).

<sup>3</sup>David R. Hampton, Charles E. Summer, and Ross A. Webber, Organizational Behavior and the Practice of Management (Revised; Glenview, Ill.: Scott, Foresman and Company, 1973), p. 153.

by these authors.

Lewin reported a series of studies in which the effectiveness of a procedure he named "group decision" was compared to the lecture method of changing the food habits of housewives. The group decision method was found dramatically more effective. However, Bennet pointed out that what actually occurred in Lewin's groups was group discussion about the desirability of changing food preferences by each of the group members as individuals.<sup>4</sup> No group decision as such was made in any of his groups. Bennet's analysis suggests that Lewin contrasted the effects of a "one-way" communication process with the lecturer as the sender of verbal messages to the group members as receivers versus the effects of a "two-way" process whereby individuals could be interacting verbally as both senders and receivers.

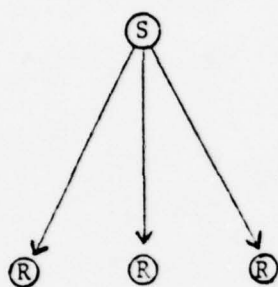
The one-way versus two-way communication process can be depicted in terms of channels linking senders and receivers. The one-way process links the sender with the receiver and communication is only from the sender to receiver. The two-way process allows communication in both directions, and in a multiple person setting, all persons are alternately senders and receivers linked to each other by two-way channels. These characteristics are displayed in communication network form in Figure 2-1 using a typology originated by Bavelas and expanded by Leavitt and

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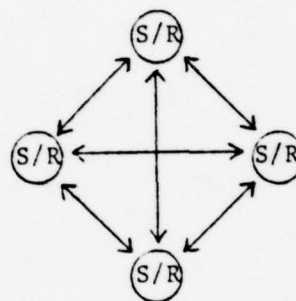
<sup>4</sup>Edith B. Bennet, "Discussion, Decision, Commitment and Consensus in 'Group Decision'," Human Relations VIII (1955): pp. 251-273.

Fig. 2-1. Communication Networks

Wheel Network



All-Channel Network



## Legend

- S - Sender
- R - Receiver
- - Direction of Transmission

Guetzkow and Simon.<sup>5</sup> The lecture method is a "wheel" network while the group discussion method is an "all-channel" network. Thus these early studies in participation suggest the use of alternative communication processes.

Another aspect of the Lewin studies of interest concerns the information communicated in the lecture and in the discussion group. Unless the information in the two methods was highly similar, the nature of the information transmitted was also a possible contributing factor to the obtained results. Thus, investigation of this important element of the communication process is also suggested by the Lewin efforts.

#### Coch and French Study

While the Lewin studies originated the participation issue, the Coch and French study of a change in work methods in a clothing factory is the first effort conducted in an organizational setting.<sup>6</sup> Their research dealt with 600 workers divided into four group types. These group types were exposed to variations of democratic procedures as follows:

The control group was notified of a decision to change work methods along with the reasons for the change.

The first experimental group was called to a meeting and the top management staff explained the need for cost reductions. General agreement was reached in the meeting that costs could be reduced. No formal group decision was reached. A group repre-

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<sup>5</sup>Alex Bavelas, "Communication Patterns in Task-Oriented Groups," Journal of the Acoustical Society of America XXII (1950): 725-730; Harold J. Leavitt, "Some Effects of Certain Communication Patterns on Group Performance," The Journal of Abnormal and Social Psychology XLVI (1951): 38-50; Harold Guetzkow and Herbert A. Simon, "The Impact of Certain Communication Nets Upon Organization and Performance in Task Oriented Groups," Management Science I (1955): 233-250.

<sup>6</sup>Lester Coch and John R. P. French, Jr., "Overcoming Resistance to Change," Human Relations I (1948): 512-532.



sentative was chosen to work out the new methods with top management.

The second and third experimental groups went through the same type of group meeting as the first experimental group. Instead of selecting a representative, all the members in these groups met with management personnel to design the new jobs. Then the time and motion study personnel set the new work standards.<sup>7</sup>

Coch and French found that all three of the experimental groups significantly outperformed the control group with respect to the new work standards. The control group, in turn, exhibited a greater turnover rate than the experimental groups. Based on these results the researchers labeled the procedures used as participation and concluded that learning is directly related to such participation, while turnover and aggression toward management are inversely related to such participation.<sup>8</sup>

Examination of these alternative procedures suggests that Coch and French allowed two things to vary related to the communication process. First, the process itself varied from one-way for the control group to two-way discussion for the experimental groups. Secondly, the information transmitted through the networks within the processes varied. The control group received only the managerial decision and reasons, while the experimental groups exchanged information from both management and subordinates prior to the groups receiving the managerial decision. Thus the obtained results may have been due to either or both of these factors.

While neither the Coch and French study nor the Lewin efforts explicitly investigated the communication process, both clearly utilized

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<sup>7</sup>Ibid., pp. 514-516.      <sup>8</sup>Ibid., pp. 530-532.

it. Further, the descriptions of procedures strongly suggest that alternative processes in terms of networks were involved and variations in information transmitted through these networks occurred. However, subsequent studies did not explore these communication processes and information transmissions explicitly. Rather, studies concerned with subordinate influence on decisions and shared control by management with subordinates evolved from this early research.

#### Participation as Subordinate Influence on Decisions

Studies concerned with influence stem from a critique of the Coch and French study. Lawrence questioned whether participation really occurred in their investigation and asserted that participation was a feeling on the part of people, not just the mechanical act of being called in to take part in discussions.<sup>9</sup> Although Lawrence did not specify the precise nature of this feeling, two closely related studies established subordinate influence on the decisions made as the feeling or perception of interest. These are the studies of French, Israel, and As and Vroom.

#### The French, Israel, and As Study

French, Israel, and As noted that there was little conceptual basis for the participation concept in the Coch and French study, and thus replicated that effort in a Norwegian footwear factory.<sup>10</sup> Their purpose was to test a more precise theory of participation with more careful

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<sup>9</sup>Paul R. Lawrence, "How to Deal with Resistance to Change," Harvard Business Review (May-June 1954), p. 40.

<sup>10</sup>John R. P. French, Jr., Joachim Israel, and Dagfinn As, "An Experiment on Participation in a Norwegian Factory," Human Relations, XIII (1960): 3-19.

empirical methods. They defined participation as:

A process in which two or more parties influence each other in making certain plans, policies, and decisions. It is restricted to decisions that have future effects on all those making the decisions and on those represented by them. . . The amount of participation of [a participant] is defined as the amount of influence on the decisions and plans agreed upon, or equivalently, the amount of influence that [other participants] accept during the joint decision making process.<sup>11</sup>

They also made a distinction between psychological and objective participation:

The psychological refers to a person's perception of the amount of influence on jointly made decisions, where [objective] refers to the observed amount of influence (as determined by the social scientist). Wherever perception is accurate, the amount of psychological participation is equal to the amount of objective participation. However, the two will frequently differ because of the effects of the [participant's] needs on his social perception and because of the inadequate or distorted information received concerning [one's] own influence.<sup>12</sup>

French, Israel, and As considered objective participation as a discussion activity conducted by management representatives. Psychological participation was measured by subordinate responses to a questionnaire concerning degree of perceived influence. In discussions of production activity, length of training, division of labor, and job assignments within groups, the objective participation showed a stronger relationship to improved worker-management relations than did psychological participation.<sup>13</sup>

The effects of objective and psychological participation in this study suggest support for the expected differences between perceived participation and objective participation. Further, since both results are obtained from the same activity, this suggests that the mechanism through which perceived influence occurred was the discussion activity,

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<sup>11</sup>Ibid., pp. 3-4.    <sup>12</sup>Ibid.    <sup>13</sup>Ibid., p. 17.

or objective participation. However, these results are considered only suggestive, because French, Israel and As did not control or measure the information exchanged that comprised the discussion activity, and thus did not explicitly link the activity to the obtained results. They merely allowed discussion to occur or not to occur. Further, the researchers point out that their study confounded the effects of the opportunity to participate with the effects of taking part in the discussion activity. That is, an individual could have been in a position, and have had the ability, to exert influence without actually having exercised this potentiality, and an increase in participation as discussion involved a corresponding increase in this opportunity. They therefore concluded that this opportunity may have had the same effects as actual participation.<sup>14</sup> However, the results do suggest that explicit investigation of the information transmitted within the discussion may allow the determination of whether perceived influence results from actual participation.

One aspect of the discussion activity for investigation is suggested by French, Israel and As. They note that since the joint decision making process involves the exchange of information, it provides the opportunity for resolving differences of opinion.<sup>15</sup> Thus, they not only point to an element of the communication process, but suggest that an explicit investigation of the opinions held and discussed by participants may lead to insights concerning the effects of participation as discussion activity.

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<sup>14</sup>Ibid., p. 17.    <sup>15</sup>Ibid., p. 7.



### The Vroom Study

The conceptual basis for participative decision making advanced by French, Israel and As was incorporated by Vroom in his study of the relationships among personality variables, participative decision making, and job related attitudes.<sup>16</sup> Vroom noted that French, Israel and As had made the distinction between psychological and objective participation, and he therefore attempted to equate perceived influence by a given individual with the perception by other individuals of actual influence. He measured the amount of influence perceived by an individual on the plans and decisions agreed upon, but could not confirm the equivalence of this perceived influence and perceptions of actual influence by the other individuals. Thus, he cautioned that the findings of his study held only for psychological participation. Among the relationships found were that perceived influence was positively related to favorable attitudes toward the job and to motivation for effective performance.<sup>17</sup>

Vroom's measure of participation as perceived influence suggests he was assessing the effects of information exchange in a communication process. His psychological participation measure consisted of five point Likert-scaled responses to the following questions:

1. In general, how much say or influence do you feel you have on what goes on in your station
2. Do you feel you can influence the decisions of your immediate supervisor regarding the things about which you are concerned
3. Does your immediate superior ask your opinion when a problem comes up that involves your work

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<sup>16</sup>Victor H. Vroom, Some Personality Determinants of the Effects of Participation (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1960).

<sup>17</sup>Ibid., pp. 47-49.

4. If you have a suggestion for improving the job or changing the set-up in some way, how easy is it for you to get your ideas across to your immediate supervisor<sup>18</sup>

These questions, in dealing with items such as "how much say," "ask your opinion," and "get your ideas across," indicate the information exchange aspects and link these phrases to influence. However, Vroom did not investigate any specific communication process to allow an actual linkage to either actual or perceived influence. Thus, an individual may or may not have perceived influence when communication did or did not occur and actual influence did or did not result.

The possibility that influence results from communication as both the French, Israel and As and the Vroom studies suggest has been the focus of much communication research in the field of persuasion. Brembeck and Howell note persuasion, as communication intended to influence choice, is purposeful and must share the attributes of effective communication in attempting to modify the intended receiver's attitudes or behaviors in some predetermined manner. These attributes include a clearly specified purpose, effective message construction in the oral, written, or other visual language employed, and provision for a reciprocal process of interstimulation between the source and receiver.<sup>19</sup>

The French, Israel and As and Vroom studies thus suggest, in the context of persuasion research, the viability of the communication process approach to explicitly link the perception of influence by participants to actual participation. In this context, participation involving communication as persuasion is a process in which each participant

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<sup>18</sup>Ibid., pp. 77-78.

<sup>19</sup>Winston L. Brembeck and William S. Howell, Persuasion: A Means of Social Influence (2nd. ed.; Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1976), pp. 10-11.

attempts to modify other's choices of attitudes or behaviors with respect to the decisions to be made. By systematically investigating the decision as the specified purpose and the nature of the information exchanged in the discussion activity or two-way communication between participants, the determination of whether an explicit linkage exists between actual participation and influence of participants can be made.

#### Participation as Shared Control of Decision Making

The Coch and French study fostered a second stream of research based on the democratic procedures in their investigation. These studies view participation as the sharing of control of the decision making process by the manager with subordinates. The efforts of Morse and Reimer, Heller and Vroom and Yetton are classified under this approach.

#### The Morse and Reimer Study

Morse and Reimer viewed participation on a control dimension in an eighteen month study of clerical workers in an industrial organization. The researchers developed two programs that varied who actually made the decisions. In the autonomy program group decisions were made on work methods and procedures and some personnel matters by the clerical workers as groups. In the hierarchical program all decisions were imposed on the groups by supervisory personnel. Morse and Reimer found support for the hypothesis that the increased role in the decision making process in the autonomy program increased the satisfaction of the groups, but also concluded that the performance of groups, measured in terms of cost reduction, was greater in the hierarchical program than that of groups in the autonomy program. However both programs achieved

cost reductions.<sup>20</sup>

The Morse and Reimer study established the retention of control through the imposition of the decision by management and the sharing of control through the use of a joint decision making process. From the discussion of early participation research, the retention can be seen to involve a one-way communication process and the sharing of control, by contrast, a two-way communication process.

#### The Heller Study

Heller reported a study which extended participation as influence to include the control dimension in his investigation of managerial decision making.<sup>21</sup> He interviewed 260 senior business executives in fifteen large organizations to assess how managers perceived they used participative methods in making decisions and the reasons for using such methods.

Heller based his view of participation on the French, Israel and As concept, but used the following definitions:

Influence - A person exercises influence if, as a result of direct or indirect intervention, his preferences are considered in the process of arriving at a decision.

Power - A person exercises power when, as a result of his direct or indirect intervention, his preferences are incorporated in the decision process.<sup>22</sup> (emphasis added)

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<sup>20</sup> Nancy Morse and Everett Reimer, "The Experimental Change of a Major Organizational Variable," The Journal of Abnormal and Social Psychology LII (1956): 120-129.

<sup>21</sup> Frank A. Heller, Managerial Decision Making: A Study of Leadership Styles and Power Sharing Among Senior Managers (London: Tavistock, 1971) (hereinafter referred to as Managerial Decision Making).

<sup>22</sup> Ibid., p. xxiv.



He then combined these definitions to develop an influence-power continuum as a means to extend the democratic-authoritarian-participative concept.<sup>23</sup> This continuum has five points identified of alternative styles of decision making:

1. Leader makes the decisions alone
2. Leader makes the decisions alone and adopts a formal method of communicating the result
3. Prior consultation is used, but the decision is made by the leader
4. Decision is jointly made by the leader and the subordinate
5. Leader delegates the decision to the subordinate

The locus of control moves from the leader alone to the subordinate alone over the continuum. Of interest is that point 2 suggests a one-way communication process is used to impose the result as in the Morse and Reimer study, while point 4, in using the joint decision making process, suggests a two-way communication process. Thus this continuum suggests the operational means to sharing control is through the use of alternative communication processes.

Heller reports that managers in general cited the reasons for using participative methods to be, in decreasing order of importance; improving the technical quality of decisions, increasing the satisfaction of subordinates, improving the understanding of the problem, training and facilitating change. In particular, managers in his study considered the probable results of using joint decision making to be improved decision quality and improved morale on the part of subordinates, but it would take longer.<sup>24</sup>

Heller makes an interesting observation by relating the manager's

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<sup>23</sup>Ibid., p. 27.    <sup>24</sup>Ibid., pp. 74-75.

cited reasons for using participative methods to the problem of psychological versus objective participation raised in the French, Israel, and As study. He notes that the connection between participatory practices and satisfaction of subordinates and improvements in productivity is a strong temptation for managers to manipulate such practices. Because participation is easily counterfeited, and may not be detected, such "psuedo"-participation may lead to higher morale and therefore higher output. But Heller asserted that if managers use participation to increase the technical quality of decisions, improve understanding of the problem, or train subordinates, success does not depend on producing a feeling of, or perceived, participation; success depends on the activity of participation itself.<sup>25</sup> While he does not specify the precise nature of this activity, his definitions of power and influence and his continuum suggest that it is communication.

#### The Vroom and Yetton Study

Vroom and Yetton developed a normative model for the use of participative decision making techniques based on an extensive analysis of leadership and managerial decision making similar to the Heller study.<sup>26</sup> Basing their analysis on participation as influence, the focus of the model development is:

Given the existence of a property such as participation that varies from high to low, it should be possible to define leader behaviors representing clear alternative processes for making decisions that can be related to the amount of participation

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<sup>25</sup>Ibid., p. 93.

<sup>26</sup>Victor H. Vroom and Phillip W. Yetton, Leadership and Decision Making (Pittsburgh, Pa: University of Pittsburgh Press, 1973).

each process affords the manager's subordinates.<sup>27</sup>

Vroom and Yetton developed a taxonomy of decision processes as the basis for their model, which is displayed in figure 2-2. This figure summarizes the alternative decision styles a manager may consider in addressing a problem or decision situation.

The descriptions of the decision styles in figure 2-2 crystallize the use of the communication process and the extent of communication within each style. The group problem column suggests the use of a two-way communication process involving the all channel network for the AII and subsequent styles. The CI style varies the number of individuals in the network at any one time. The AI style, if used, suggests that the one-way process using the wheel network would be used if it were necessary to communicate the decision to subordinates. Moving down the column also finds the manager increasingly involved as both sender and receiver in the communication process with subordinates, and importantly, the information transmitted in the process becomes specified. The information first concerns facts about the problem and then ideas, suggestions, and alternative solutions concerning the problem or decision.

Taken together, these studies concerning the concept of shared control strongly suggest the use of one-way versus two-way communication processes as the means to involve subordinates in the decision making process with management. As seen earlier, these processes can be depicted in terms of communication networks. Further, the Vroom and Yetton taxonomy suggests variations of information exchanged within the two-way process. A systematic investigation of these networks and

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<sup>27</sup>Ibid., p. 12.

Fig. 2-2. Decision Styles Taxonomy

Group Problems	Individual Problems
<p>AI. You solve the problem or make the decision yourself, using information available to you at the time.</p> <p>AII. You obtain the necessary information from your subordinates, then decide the solution to the problem yourself. You may or may not tell your subordinates what the problem is in getting the information from them. The role played by your subordinates in making the decision is clearly one of providing the necessary information to you, rather than generating or evaluating alternative solutions.</p> <p>CI. You share the problem with the relevant subordinates individually, getting their ideas and suggestions without bringing them together as a group. Then <u>you</u> make the decision, which may or may not reflect your subordinates' influence.</p> <p>CII. You share the problem with your subordinates as a group, obtaining their collective ideas and suggestions. Then you make the decision, which may or may not reflect your subordinates' influence.</p> <p>GII. You share the problem with your subordinates as a group. Together you generate and evaluate alternatives and attempt to reach agreement (consensus) on a solution. Your role is much like that of chairman. You do not try to influence the group to adopt "your" solution, and you are willing to accept and implement any solution which has the support of the entire group.</p>	<p>AI. You solve the problem or make the decision by yourself, using information available to you at the time.</p> <p>AII. You obtain the necessary information from your subordinate, then decide on the solution to the problem yourself. You may or may not tell the subordinate what the problem is in getting the information from him. His role in making the decision is clearly one of providing the necessary information to you, rather than generating or evaluating alternative solutions.</p> <p>CI. You share the problem with your subordinate, getting his ideas and suggestions. Then you make a decision, which may or may not reflect his influence.</p> <p>GI. You share the problem with your subordinate, and together you analyze the problem and arrive at a mutually agreeable solution.</p> <p>DI. You delegate the problem to your subordinate, providing him with any relevant information that you possess, but giving him responsibility for solving the problem by himself. You may or may not request him to tell you what solution he has reached.</p>



information variations appears appropriate. As these efforts were field studies, it is not possible to unambiguously determine whether the results obtained in these studies are due to either the variations in the degree of shared control or to the variation in the nature and extent of information exchanged within the joint decision making process.

### Participative Budgeting Research

About the same time as the Coch and French study, Argyris assessed the effects of budgets on employee attitudes in a field study of supervisors in manufacturing companies, and concluded that:

Goals are more often accepted if the individual members can come together in a group, freely discuss their opinions concerning these goals and take part in defining the steps by which these goals will be accomplished.<sup>28</sup> (emphasis added)

The discussion of opinions and participation in definition of steps by employees suggest that a communication process is central to Argyris's conclusion. However communication received only limited attention in subsequent participative budgeting studies.

### The Becker and Green Participation Concept

Becker and Green proposed a conceptual framework for the investigation of participative budgeting.<sup>29</sup> They took the French, Israel and As definition of participation as influence as a basis to consider participation as:

not a single-value variable, but rather a concept encompassing several explicit variables. . . It is conceptually divisible into process and content. Process is the act of participating with the

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<sup>28</sup>Chris Argyris, "Human Problems with Budgets," Harvard Business Review (January-February, 1953): pp. 108-109.

<sup>29</sup>Selwyn Becker and David Green, Jr., "Budgeting and Employee Behavior," Journal of Business XXXV, no. 4 (1962): 392-402.

possible consequences stemming from the act; content is the discussion topic toward which are generated the positive or negative attitudes. The act of participating enables the participants to know one another, communicate and interact with one another--conditions that can easily lead to increased cohesiveness. It is clear the content of participation should be directed toward setting a new goal with discussion of a sort sufficient to enable each participant to realize that the goal is accepted by others in the group.<sup>30</sup> (emphasis added)

Thus, they consider the participation act as one enabling communication and they theorize that the effects of this process are cohesiveness and, if properly directed, participant acceptance of the goals discussed as the content of the process.

A controversy in the literature developed regarding the Becker and Green choice of the participation-as-influence approach on which to base their concept. They stated:

We do not wish to enter the controversy over the relative merits of various styles of leadership but merely wish to point to some possible limitations on the use of participation. In order to be successful, the participants must participate, that is, must have influence on the adopted decisions. If participation can be achieved under more or less authoritarian conditions, it is likely to be effective, just as it can be undermined (by disregard) with democratic leadership. Only management itself can determine whether it is worthwhile to initiate or continue participation. . . .<sup>31</sup>

Thus, they suggest that participation as influence may be limited by the leadership styles which were seen earlier in the Heller and the Vroom and Yetton studies. However, they chose not to incorporate the implications of these studies in the development of their conceptual framework.

Stedry criticized Becker and Green for this lack of consideration for leadership styles. He asserted that it seemed almost impossible to advocate participation without entering the leadership controversy and cited the results from several of the studies discussed above as support

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<sup>30</sup>Ibid., p. 396.    <sup>31</sup>Ibid., p. 401.

for his position.<sup>32</sup>

Viewing the positions of Stedry and Becker and Green in terms of a communication process suggests that to some extent they are on common ground, and their real differences are empirical questions. The shared control studies suggested that alternative leadership styles can be viewed as involving one-way versus two-way communication processes, and the influence studies involve communication as persuasion which requires a two-way communication process. Thus, Stedry's argument appears correct to the extent that the two-way process is required for a leadership style that allows participation. On the other hand, the shared control studies suggested that the degree of control can be varied in terms of the information exchanged within this two-way process. To the extent the exchange of information allows the perception of influence by subordinates, the Becker and Green contention that participation as influence may be achievable under alternative leadership styles also appears valid when viewed in this context.

Given the common ground of the two-way communication process, the relative merits of the Becker and Green hypotheses versus Stedry's counterarguments appear to be an empirical issue. However, Birnberg and Nath point out that the Becker and Green concept has gone untested in a budgeting context.<sup>33</sup> Further, though their concept

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<sup>32</sup>Andrew C. Stedry, "Budgeting and Employee Behavior: A Reply," Journal of Business XXVII, no. 2 (1964): 195-202.

<sup>33</sup>Jacob G. Birnberg and Raghu Nath, "Implications of Behavioral Science for Managerial Accounting," Accounting Review XLII, no. 3 (1967): 468-479.

suggests a communication process approach, subsequent empirical efforts have primarily utilized the influence or shared control approaches of the prior participation research.

#### The Swieringa and Moncur Studies

Swieringa and Moncur conducted two studies of manager behavior of interest. Their first study did not deal directly with participative budgeting, but some of its aspects emerged from their analysis. They conducted research on thirty branch bank managers to assess relationships between manager's self-reported budget related behavior and selected attitude, position, size, and performance measures. Utilizing Likert-scaled responses to a sixty-five item measure, the researchers found four factors accounting for 44 percent of the variance in reported behavior. These factors were labeled as different budget behaviors: the active participant; the involved exponent; the reluctant victim; and the unconcerned recipient.<sup>34</sup>

The questionnaire items loading high on the active participant factor in this study are of particular interest. Persons labeled as active participants saw themselves as influential in the activities and interactions associated with the budget process. Among the specific items comprising the active participant factor were:

I participate with other brand managers and/or home office people in preparing budgets.

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<sup>34</sup>Robert J. Swieringa and Robert H. Moncur, "The Relationship Between Managers' Budget-Oriented Behavior and Selected Attitude, Position, Size, and Performance Measures," Empirical Research in Accounting: Selected Studies 1972, supplement to Journal of Accounting Research X (1972): 193-209 (hereinafter referred to as "The Relationship Between Manager's Budget-Oriented Behavior and Selected Measures").



Home office people ask me about any special factors I wish to have considered in the budget being prepared.

New budgets are introduced in carefully planned programs which include talks or printed materials.

Special problems I mention to budget people receive special treatment in the new budget.

My superior listens to my problems in budget matters.

My superior or home office budget people listen to my opinion on budget matters.

I discuss budget items with my superiors or with home office people whenever problems occur.<sup>35</sup>

Given that these items all loaded relatively high on the active participant factor, the items suggest an association between perceived participation and communication. The first item specifically mentions participation, and all the others deal with various aspects of communication.

Swieringa and Moncur found that active participant behavior was significantly related with confidence in the organization, job satisfaction, job tension, and time spent with other managers; significantly negatively related with time spent with customers; and unrelated to any of the performance measures utilized in the study.<sup>36</sup>

In their second study, Swiering and Moncur investigated the effects of participative budgeting on manager behavior, where the managers were subordinates of higher level managers.<sup>37</sup> While this study was an exploratory and broad ranged effort, the company variable

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<sup>35</sup>Ibid., pp. 206-207.    <sup>36</sup>Ibid.

<sup>37</sup>Robert J. Swieringa and Robert H. Moncur, Some Effects of Participative Budgeting on Managerial Behavior (New York: National Association of Accountants, 1975).

utilized by the researchers as a surrogate for alternative budgeting systems and their organizational contexts is of particular interest.

In describing budgeting systems, Swieringa and Moncur assert:

Companies differ dramatically in both the amount and form of the participation and influence they afford their operating managers in the budgeting process. First, near the low end of the participation scale are the so-called autocratic methods in which the top management of a company sets operating budgets by itself, using information generally available to it at that time.

Secondly, there are methods in which top management affords operating managers some limited participation in budget setting. For example, even though it maintains ultimate budget setting responsibility, top management may obtain information from operating managers, solicit their ideas and suggestions, and/or even ask them to generate and evaluate alternatives. Top management may, of course, vary the extent to which it allows these inputs to influence the budgets it sets.

Finally, near the high end of the participation scale are the so-called group decision methods in which top management shares budget setting responsibility with operating managers; that is, they generate and evaluate alternatives together and attempt to reach agreement and consensus on the budgets set.<sup>38</sup>

A comparison of this scale with the Vroom and Yetton taxonomy displayed in figure 2-2 and discussed earlier reveals a striking resemblance. The scale in effect casts the taxonomy in a participative budgeting context. Thus, the alternative communication networks and the variation of information transmitted found in the taxonomy surface in this participation scale as well.

While this second Swieringa and Moncur study viewed budgeting in a broad context, it does suggest the central role of communication in budgeting. However, the alternative communication processes and variations in information exchanged suggested by their participation

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<sup>38</sup>Ibid., pp. 21-22.

scale went largely unexplored in this study.

#### The Milani Study

Milani conducted a field study of relationships between participation in budgeting and foreman performance and attitudes toward the company and the job. He defined participation as the extent to which a subordinate is allowed to select his own courses of action. However, his measure was similar to Vroom's as it utilized a five point Likert scale for each of the following questions: the foreman's perception of the portion of the budget set; kind of reasoning provided by superiors when budget revisions occurred; frequency of budget related discussions held with the superior; amount of influence on the final budget; and the importance of the contribution to the budget. These questions suggest that, just as Vroom earlier, Milani may have been assessing the effects of communication on perceived influence. He found weak associations between performance and perceived influence, and stronger associations between the company and job-related attitudes and perceived participation.<sup>39</sup>

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<sup>39</sup>Ken Milani, "The Relationship of Participation in Budget Setting to Industrial Supervisor Performance and Attitudes: A Field Study," The Accounting Review L, no. 2 (1975): 274-284 (hereinafter referred to as "Participation in Budget Setting").

### The Foran and DeCoster Study

Foran and DeCoster conducted a laboratory study of the effects of participation, authoritarianism, and feedback on subjects' attitudes about performance standards that they helped to establish.<sup>40</sup> This research explicitly attempts to investigate the variation of alternative communication processes in terms of communication networks. The approach is based on their view that:

The amount of participation and individual influence an employee can exert is limited by the number of open communication channels available. In this respect, channeled and non-channeled communication networks provide two forms of participation.<sup>41</sup>

The researchers used the wheel network to simulate a hierarchical organization and the all channel network to simulate an organization where all members could freely communicate. Thus this study attempted to compare the effects of two alternative communication processes as suggested by the studies comprising the shared control approach.

Foran and DeCoster found support for their hypotheses that feedback about participation in general would reduce dissonance or incongruence about the participative session and its outcomes, and favorable feedback about participation would result in greater commitment to the performance standards set. However, they found no significant effects related to the independent variables of communication networks or the personality variable of authoritarianism.<sup>42</sup>

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<sup>40</sup>Michael Foran and Don T. DeCoster, "An Experimental Study of the Effects of Participation, Authoritarianism and Feedback on Cognitive Dissonance in a Standard Setting Situation," The Accounting Review XLIX, no. 4 (1974): 751-762.

<sup>41</sup>Ibid., p. 753.    <sup>42</sup>Ibid., pp. 761-762.



The absence of any significant effects due to the alternative communication networks, on its face, suggests that the Foran and DeCoster hypothesis that the wheel network is a constraint on participation is not supported, and thus contradicts the suggestion of the studies relating to shared control. However, the prior research suggests the wheel network is a no-participation condition whereby the decision is imposed through a one-way communication process. Foran and DeCoster note that their study actually allowed a psuedo-participation condition to occur in their wheel network, since the same variation in feedback was provided subjects in this network as in the all channel condition.<sup>43</sup> Thus, the wheel become a two-way process and the only difference to the subjects was the written communication concerning feedback in the wheel versus verbal in the all channel. Accordingly, the study failed to effectively vary the two alternative communication processes, and thus the absence of significant differences is not surprising.

#### The Cherrington and Cherrington Study

Cherrington and Cherrington reported a study that attempted to operationalize participation on a control dimension. In their view one of the most important dimensions of budget participation is the amount of control which participants exercise in the formation of a budget.<sup>44</sup> The researchers conducted a laboratory study to assess

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<sup>43</sup>Ibid., pp. 761-762.

<sup>44</sup>David J. Cherrington and J. Owen Cherrington, "Appropriate Reinforcement Contingencies in the Budgeting Process," Empirical Research in Accounting: Selected Studies 1973, supplement to the Journal of Accounting Research XI (1973): 225-256.

the independent variables of budget participation as control and reinforcement contingencies on subject satisfaction and performance.

The study utilized undergraduate business students in four person groups on a paper construction task. Prior to the task, each group was given facts concerning the nature of the task. The groups were then randomly assigned to one of four conditions varying from one extreme of no control to the other of total participant control:

1. Imposed - the performance standard the group was expected to achieve was imposed on the group by the experiment "supervisor"
2. Lenient - the performance standard the group was to achieve was set by the supervisor at an easily attainable level. The group submitted estimates of the standard until the easy standard was met or exceeded
3. Pseudo-participation - same conditions as lenient, except the standard was difficult to achieve
4. Group-based - same conditions as lenient, except the first standard estimate the group submitted was accepted, regardless of the level of difficulty <sup>45</sup>

Thus the locus of control shifted from the supervisor in conditions 1 through 3 to the group in condition 4, rather than varying across conditions, since the supervisor had total (prior) control in conditions 1 through 3 and no control whatsoever in condition 4 concerning the impact of the group estimate on the standard to be achieved.

Cherrington and Cherrington reported significant results for the budget control variable on both the number estimated and the number actually made of items in the paper construction task. For the number estimated, the pseudo-participation condition was highest, followed in order by the group based and lenient conditions.<sup>46</sup> However,

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<sup>45</sup>Ibid., pp. 235-236.    <sup>46</sup>Ibid., pp. 237-241.

Hofstede criticized the experimental design at length, particularly the experimental variation of the control dimension. In his view, the interpretation of the experimental findings was severely limited by the inadequacies of the design.<sup>47</sup>

Despite the deficiencies of the Cherrington and Cherrington study, it does indicate an operational means to expand the sharing of control between the two extremes on Heller's continuum of no control and total subordinate control in a budgeting context. The study effectively varied the one-way versus the two-way communication process, and further, it provided the subjects the facts concerning the problem as suggested by AII and subsequent group decision styles in the Vroom and Yetton taxonomy.

#### Conclusions

The preceding review of the research indicates that, in general, a communication process approach is appropriate to investigate participative budgeting questions. The specific suggestions of the research are summarized below as the basis for the approach taken to the investigation of participation budgeting questions in this study.

Studies related to participation as influence suggest that persuasion as communication intended to influence choice of attitudes or behaviors may provide the explicit linkage between participation activity and subordinate influence on decisions made. Thus the approach of this study provides a basis of the attributes of

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<sup>47</sup>Thomas R. Hofstede, "Discussion of Appropriate Reinforcement Contingencies in the Budgeting Process," Empirical Research in Accounting: Selected Studies 1973, supplement to Journal of Accounting Research XI (1973): 257-266.

effective communication required by persuasion to develop a participative budgeting model. The budget is established as the specified purpose of participation, the nature of the information transmitted is specified in the budgeting situation as the basis for effective message construction, and the two-way communication process is incorporated in the model to allow for interstimulation between participants.

Studies related to participation as shared control suggest that a two-way communication process is the means to involve subordinates in decision making, and the variation in shared control is accomplished through the nature and extent of information exchanged within the two-way process. Thus the approach of this study incorporates the information variations suggested by the prior research to specify the nature of the information transmitted in the budgeting situation. The two-way communication process suggested by the shared control studies is consistent with the influence studies.

The Becker and Green research suggests a communication approach to participation in budgeting and hypothesizes goal acceptance as an outcome of subordinate involvement in the process. Thus their participation concept is incorporated in the model of the study, and their hypotheses are examined to provide the basis for an experimental test of the model.

The next chapter reports the development of the participative budgeting model based on this approach and the hypotheses drawn from this model that are tested in the experiment of the study.



CHAPTER THREE

THE MODEL AND HYPOTHESES

OF THE STUDY

The purpose of this chapter is to develop a participative budgeting model and to construct a set of hypotheses concerning its effects in terms of a communication process approach. The development is based on the suggestions of prior participation-related research and incorporates appropriate research from communication theory to structure the communication process components and relationships in the model. The hypotheses are constructed from the Becker and Green research in conjunction with studies in communication. These hypotheses concern the question of whether more favorable attitudes toward the budget result from participation in budgeting and the question of how such attitudes result from this participation.

The Participative Budgeting Model

This section develops the model of the study in terms of a communication process. Several underlying concepts are first discussed to clarify the concept of participative budgeting used to develop the model. These concepts are observational or empirically valid in the sense that, as Kaplan phrases it, "they lend themselves to easy and confident verifications."<sup>1</sup> The development of the model incorporates

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<sup>1</sup>Abraham Kaplan, The Conduct of Inquiry: Methodology for Behavioral Science (San Francisco: Chandler, 1964), p. 54.

the appropriate operational aspects of these concepts.

### Underlying Concepts

#### The Budget

The budget is top management's written quantitative plan for the allocation of resources to attain organizational objectives for a given time period. Kohler's Dictionary for Accountants defines the budget as:

A financial plan serving as a pattern for and control over future costs; any estimate of future costs; a systematic plan for the utilization of resources.<sup>2</sup>

Similarly, Hanson views the budget as a formal statement by management of its plans for a given time period which will be used as a guide during that period.<sup>3</sup>

Imbedded within this view are control and motivational issues.

Stedry discusses Kohler's definition, noting:

Implicit within the definition is a plan indicating requirements at some future date to provide information for subsequent decisions and possible guiding them; and control criteria of cost or performance which will be compared with actual data or operations, thus facilitating evaluations and possibly encouraging or even enforcing some measures of efficiency. These separate functions need not be mutually exclusive nor, in practice, is it unusual for both to be represented in a single document.<sup>4</sup>

Ronen and Livingstone consider that planning, control, and motivational issues are inherent in budgets. They view the interrelation-

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<sup>2</sup>Eric L. Kohler, Dictionary for Accountants (4th ed., Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1970).

<sup>3</sup>Ernest I. Hanson, "The Budget Control Function," The Accounting Review XLI, no. 2 (1966): 239-243.

<sup>4</sup>Andrew C. Stedry, Budget Control and Cost Behavior (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1960), p. 9.

ships among these issues as reason for explicit consideration of motivational issues in the planning and control processes.<sup>5</sup>

### The Budgeting Process

The budgeting process is defined as the organizational planning activities required to develop the budget. This view is a limited one, as the general notion of budgeting encompasses both planning and control functions. The Accountants' Handbook terms budgeting as:

The act of intelligently planning future activities and making regular measurements of the success with which those plans are being carried out.<sup>6</sup>

Becker and Green note that budgeting in the early 1900's was viewed primarily as an instrument of control, with techniques stemming from governmental accounting practices. During the 1930's the budget came to be viewed as a financial plan as well. A simple budget cycle evolved in that budgets were imposed, performance occurred, and the comparison of performance against budget influenced the next budget.<sup>7</sup> The general view of budgeting thus involves the activities of the budget cycle.

The present study is limited to the planning function due to the complexity of the budgeting process suggested by the general view of budgeting and the issues inherent in the use of budgets. However, this limited view is not intended to imply that the motivational and control

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<sup>5</sup>J. Ronen and J. L. Livingstone, "An Expectancy Theory Approach to the Motivational Impacts of Budgets," The Accounting Review L, no. 4 (1975): 671-685.

<sup>6</sup>The Accountants' Handbook, 4th ed., ed. by Rufus Wixon (New York: Ronald Press Company, 1961), p. 4-2.

<sup>7</sup>Becker and Green, "Budgeting and Employee Behavior," p. 393.

issues are ignored in the planning function. Rather, this focus is seen as a necessary initial step to allow an eventual systematic exploration of these issues.

#### The Planning Function

The planning function is defined in A Statement of Basic Accounting Theory. The statement views planning as primarily, if not entirely, a decision making activity concerning choices between alternatives. Four stages are identified within the planning function: recognizing and defining the problem; searching for alternative solutions; evaluating the alternative solutions, and selecting the alternative based on the results of evaluation.<sup>8</sup>

The statement points out that each of the planning stages requires information. For defining the process, information is required to permit not only an awareness of its existence, but an understanding of cause and effect. Searching for alternative solutions requires information on the structure and processes involved in the particular problem areas. Evaluating the alternatives is closely linked with the search stage but involves more explicit and detailed information concerning the effect of each alternative on the organization. The selection of an alternative involves decision models which influence the information needed throughout the planning process. The statement also indicates that, while a range of problems may be encountered by the planning function, the same stages should always be present in

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<sup>8</sup>American Accounting Association, A Statement of Basic Accounting Theory (Sarasota, Fla.: American Accounting Association, 1966), p. 45.



the approach to solving the problem.<sup>9</sup> Thus budgeting as a planning process should always involve these stages and require the associated information.

### Participation

The present analysis adopts the Becker and Green concept of participation introduced in the previous chapter as:

Conceptually divisible into process and content. Process is the act of participating with the possible consequences stemming from the act. . . . The act of participating enables the participants to know one another, communicate and interact with one another. . . . Content is the discussion topic.<sup>10</sup>

This view of participation implies several participants, and as the act enables communication and interaction to occur among these participants, this process view clearly involves the opportunity for communication.

### The Communication Process

McLeod and Chaffee note that although there are many definitions of communication, almost all agree that at least two people must be involved in it.<sup>11</sup> Chambers states that communication as a physical process takes place when signals are transmitted from a source to a receiver through a channel linking the source with the receiver, and communication between persons is a matter of transmitting signals.

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<sup>9</sup>Ibid., pp. 44-48.

<sup>10</sup>Becker and Green, "Budgeting and Employee Behavior," p. 396.

<sup>11</sup>Jack M. McLeod and Steven H. Chaffee, "Interpersonal Approaches to Communication Research, American Behavioral Scientist XVI, no. 4 (1973): 469.

establishing in the mind of another what one has observed.<sup>12</sup> Thus, as discussed in the previous chapter, communication involves the elements of source, receiver, signal transmission, and channel.

The two-way communication process, also discussed in the previous chapter, allows for the persons in the process to alternate between sender and receiver roles, and thus communicate with each other. By contrast, the one-way process maintains persons in sender or receiver roles, with no provision for alternation or feedback.<sup>13</sup> Thus the two-way process is necessary for interactive communication to occur.

#### A Participative Budgeting Concept

Taken together, the above concepts establish the basis underlying the model of the study. Budgeting is a decision making activity directed toward the selection of the budget as a resource allocation plan. The budget, as top management's plan, implies its involvement in budgeting. The review in the previous chapter established participation as subordinate involvement in decision making. Given budgeting as a decision making activity, subordinate involvement in budgeting is implied by a participation approach. Thus, the participants in the process are management and subordinates, and to the extent they effectively communicate with each other concerning the budget, the basic elements of an interactive communication process are defined in a budgeting context. Thus participative budgeting is defined as an

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<sup>12</sup>Chambers, Accounting, Evaluation, and Economic Behavior, pp. 166-167.

<sup>13</sup>This view assumes communication is only occurring in one mode, such as verbal or written. In an interpersonal setting, nonverbal communication is likely also occurring, but is not considered in the present analysis.

interactive or two-way communication process involving management and subordinates in the planning function to develop the budget.

This concept specifies the budget as the purpose of the communication and provides for interstimulation between management and subordinates. Thus this concept provides for two of the attributes of effective communication as persuasion suggested by the participation as influence studies. Further, the interactive communication activity corresponds to the Becker and Green act or process of participation, and the budget related communication corresponds to their content of participation. The operational aspects of this participative budgeting concept suggested by those underlying it are incorporated in the model of the study discussed below.

#### The Model of the Study

Given the underlying participative budgeting concept, the model development specifies the roles of the participants and incorporates the informational requirements of the planning function in this interactive communication process to establish a proposed operational model. The role specification in the two-way communication process is the means suggested by the shared control research to involve subordinates in the decision making process and the information requirements relate to the means suggested by this research to vary the sharing of control. The information requirements also provide the basis for effective message construction as the third attribute of communication as persuasion suggested by the influence research.

The Bales and Strodtbeck group problem solving model from communication research is used to aid the specification of participant

roles and varying information requirements.<sup>14</sup> This model is used to recast the planning function stages as phases and the information requirements as messages or interactions. Then the model is related to the Vroom and Yetton decision style taxonomy to specify the participant roles.

### Phases

The Bales and Strodtbeck model consists of three phases involving variations in the nature and extent of interactions among group members in a problem solving situation. These phases and the associated interactions are:

Orientation - In this phase it is assumed that each member of the group has some relevant facts about the problem to be solved. In addition, however, each member has some degree of ignorance and uncertainty about the problem solving situation. Thus, the phase of orientation entails the distribution of information among the members. Interactions specifically involve asking for and receiving information.

Evaluation - In this phase, it is assumed that members will attempt to harmonize differences in opinions and interests with the purpose of reaching a solution. Interactions involve expressing feelings, giving opinions, and developing an analysis.

Control - Directional interactions occur at this phase. Interactions designed to pressure members into line and toward a group decision are common. Ideas, suggestions, and possible alternatives are weighed and ranked in terms of the group's task.<sup>15</sup>

These phases correspond closely to the stages of the planning function. The orientation phase corresponds to the first planning stage of recognizing and defining the problem. The evaluation phase

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<sup>14</sup>Robert F. Bales and Fred L. Strodtbeck, "Phases in Group Problem-Solving," Journal of Abnormal and Social Psychology XLVI (1951): 485-495.

<sup>15</sup>Ibid., p. 487.



includes the second and third stages in planning; searching for, and evaluating, alternative solutions. As noted earlier, the second and third planning stages are closely linked by information requirements. The control phase corresponds to the final planning stage of alternative selection. Thus, these phases are considered to represent the planning function in the model.

#### Messages

The nature of the discussion of interactions within each phase of the group problem solving model corresponds to the information requirements of each stage of the planning function. In terms of a budgeting situation, interactions in the orientation phase concern the information required to recognize and understand the resource allocation problem. The interactions in the evaluation phase focus on the search for and evaluation of alternative resource allocation plans. The control phase interactions weigh and rank the alternatives, thus corresponding to the selection of a particular plan or budget. This characterization of the discussion within each phase of the problem solving model is considered an appropriate depiction of the budgeting related information exchanged in the interactive communication between participants in the planning phases to develop the budget.

#### Participant Roles

The participative budgeting concept involves both management and subordinates in the decision-making activity of the planning function. Since the budget which results is management's plan, as Becker and Green point out, "only management itself can determine whether it is

worthwhile to initiate or continue the participation segment of the budget cycle."<sup>16</sup> Thus, the management role is clearly the initiating one.

This management role is suggested by certain alternatives from the Vroom and Yetton taxonomy of decision styles which can be readily linked to the Bales and Strodtbeck model phases. The appropriate alternatives, with the associated problem solving phase or phases in parentheses, are:

Autocratic II - The manager obtains the necessary information from the subordinates, then decides on the solution to the problem himself. He may or may not tell the subordinates what the problem is in getting the information from them. The role of subordinates is clearly one of providing information, rather than generating or evaluating alternative solutions. (Orientation Phases)

Consultative II - The manager shared the problem with subordinates as a group, collectively obtaining ideas and suggestions. Then the manager may or may not be influenced by the subordinates as he makes the decision. (Orientation and Evaluation Phase)

Group II - The manager shares a problem with the subordinates as a group. Together, generation and evaluation of alternatives occurs and the attempt is made to reach agreement (consensus) on a solution. The manager does not try to influence the group to adopt his decision. The group decision is accepted and implemented. (Orientation, Evaluation, and Control Phases)

These decision style alternatives clearly provide the initiating role for management. In addition, the nature of subordinate involvement is specified in each alternative, and the information focus of each alternative corresponds to those of the associated phase or phases. Finally, and importantly, the alternatives allow for interactive communication between management and subordinates.

The participants, their roles, the phases of the planning

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<sup>16</sup>Becker and Green, "Budgeting and Employee Behavior," p. 401.

function and the discussion topic within each phase are displayed in figure 3-1 to depict the participative budgeting model. The model is set within the general framework of the management functions of planning and control to clarify its relationships to other aspects of the general budgeting process not considered in this study.

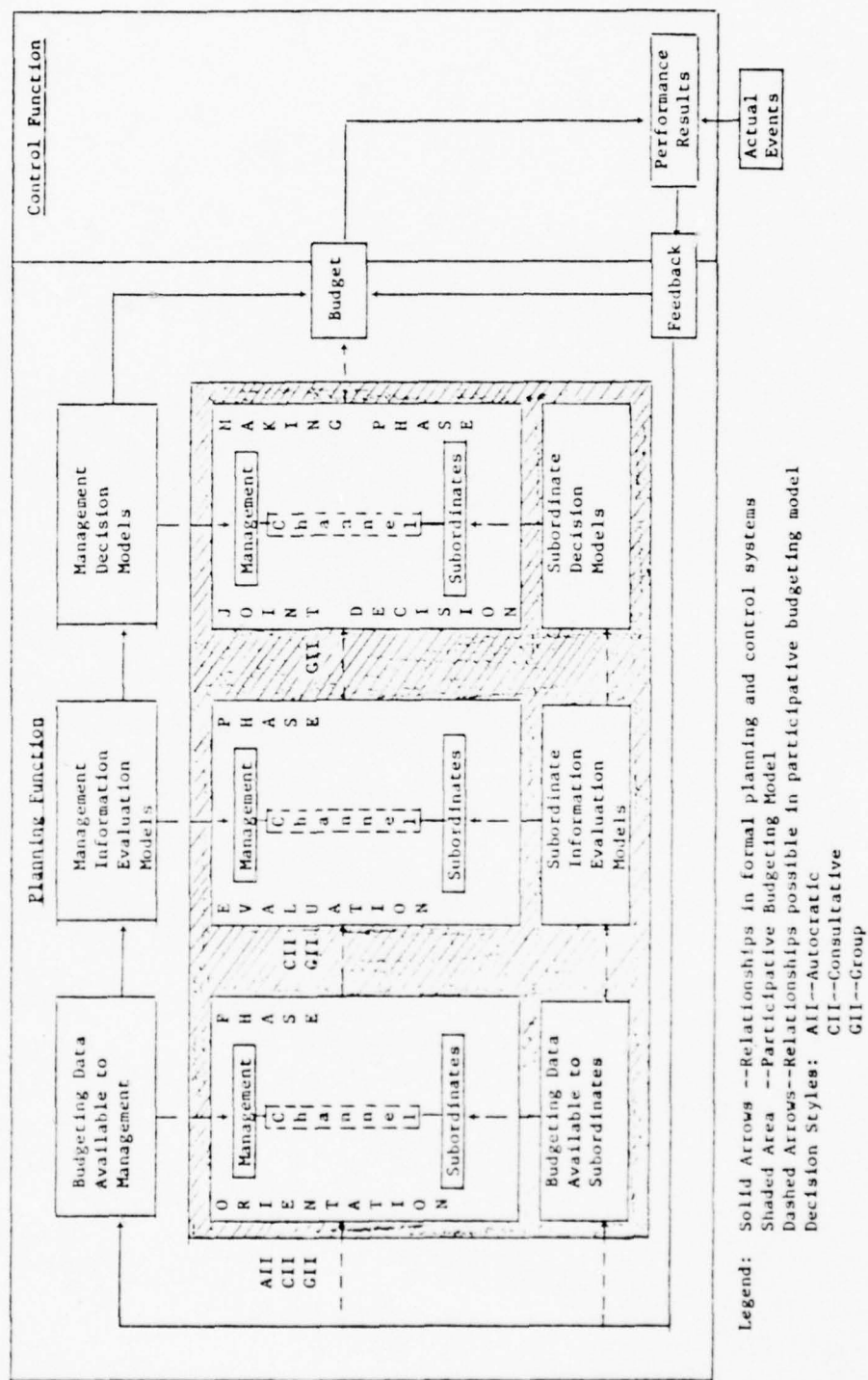
In figure 3-1 the management functions of planning and control are drawn from A Statement of Basic Accounting Theory.<sup>17</sup> The solid arrows in the diagram depict the relationships that typically exist in a managerial accounting setting. The management and subordinate information evaluation models and decision models depicted are assumed to exist and operate in a participative budgeting situation. However, they are not directly considered in this study. Also, the control phase of the group problem solving process is labeled as joint decision making to allow the term control to retain its usual meaning as a management function in an accounting context.

The shaded area contains the participative budgeting model. The dashed arrows depict the nature and extent of interactive communication that may be initiated by management over the phases of the planning function and hence the extent of allowed subordinate involvement in the budgeting process. As the decision style labels on the dashed arrows joining the phases indicate, subordinate involvement in a particular phase implies involvement in previous phases. For example, involvement in the evaluation phase means involvement occurs in the orientation phase as well. The interactive communication between manage-

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<sup>17</sup>American Accounting Association, Statement of Basic Accounting Theory, pp. 43-51.

Fig. 3-1. The Participative Budgeting Model in the General Management Framework of Planning and Control





ment and subordinates is depicted by the two-way communication channel joining them in each phase. In a multi-person setting, this interactive communication occurs through an all-channel network.

The participative budgeting model components and relationships could each be systematically examined as well as the overall operation of the model itself to assess the activity and effects of the interactive communication over the planning function phases. Further, these studies could be conducted over a broad range of organizational settings. Given that the model itself is only a proposed operational one at this point, however, it is considered appropriate to conduct a limited test of its operation and effects. Thus, the empirical effort of this study relies on the well established concepts underlying the model as a basis to expect its mechanical operation, and focuses on the effects of the interactive communication on subordinate attitudes toward the budget. Thus, the hypotheses deal with the linkage between participation and attitudes in the assumption underlying the rationale for the use of participative budgeting, and as seen in the next section, relate directly to the Becker and Green participation concept underlying the model.

#### Hypotheses of the Study

In this section, hypotheses concerning the effects of the interactive communication in participative budgeting are constructed as the basis for an empirical test of the model. The hypotheses are based on the Becker and Green research which proposes several attitude related outcomes from participation in the decision-making process. Their outcomes are analyzed in terms of attitude change models drawn

from consistency theory in communication research to establish the theoretical propriety for whether favorable subordinate attitudes toward the budget can be expected to result from participation in the budgeting process. Then, a recent communication effects models related to consistency theory is discussed and utilized to hypothesize how subordinate attitudes toward the budget may result from participative budgeting.

#### Attitudes

The Becker and Green outcomes involve subordinate attitudes toward each other as well as toward the budget. Thus, these outcomes are somewhat complex and are beyond the scope of the empirical investigation conducted in this study. However, they are fully analyzed conceptually in terms of the effects of an interactive communication process below. This analysis demonstrates that the focus on subordinate attitudes toward the budget, though limited, is appropriate for the present study.

#### The Becker and Green Outcomes

As discussed earlier, the Becker and Green participation concept may be viewed in terms of an interactive communication process which they regard as directed toward the content of management's goals. In the discussion below these goals are considered to be incorporated into management's plan for the allocation of resources as the budget.

Becker and Green reviewed the Lewin studies and concluded:

The group discussion method allows the group to assess the standards of all other members so that, if the group apparently accepts a change, he too can accept it and retain his group

membership.<sup>19</sup>

Viewing cohesiveness as individual attraction to the group or the amount of 'we' feeling generated as a result of association with others, they propose the following conditions as a definition for successful participation:

(1) providing the opportunity for enough interaction so that a cohesive group can emerge and (2) directing the interaction so that each participant's analysis of the content will enable him to accept as his own those goals adopted by the group.<sup>19</sup>

This definition serves as the basis for their expected outcomes from participation.

Becker and Green consider that the process, or act of participating, leads to cohesiveness, and that participant analysis of the content, or discussion topic of management's goals, results in the generation of positive or negative attitudes toward these goals. These results interact to produce one of the following outcomes:

1. High cohesiveness with positive attitudes (goal acceptance), a condition of maximally efficient motivation
2. Low cohesiveness with positive attitudes, an unlikely, but possible condition that probably would result in efficient performance
3. Low cohesiveness and negative attitudes, a condition resulting from unsuccessful participation that would tend to depress production within the limits of the integrity or conscience of each individual
4. High cohesiveness and negative attitudes, a condition most conducive to a production slowdown <sup>20</sup>

The first outcome, the successful participation result, displays several linkages of the assumption underlying the rationale for the use of parti-

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<sup>18</sup>Becker and Green, "Budgeting and Employee Behavior," p. 396.

<sup>19</sup>Ibid., p. 397.    <sup>20</sup>Ibid., p. 397.

cipation. In particular, the linkage between participation and high cohesiveness and positive attitudes is assumed to lead to increased motivation.

The Becker and Green description of these outcomes indicate the relative desirability and, to some extent, the relative probability of each. Each outcome is a particular combination of participant attitudes toward each other and participant attitudes toward the goals or budget. Thus, communication research in the area of consistency theory dealing with attitude change is considered appropriate to establish a theoretical basis from which to ascertain whether these attitude interactions would likely result from participation as interactive communication. A brief overview of consistency concepts is provided below as a background to analyze these attitude outcomes.

#### Consistency Concepts

Zajonc discusses several concepts that, taken together, provide an appropriate means to analyze the effects of communication on attitudes.<sup>21</sup> The concepts of interest are the balance principle of Heider, the strain toward symmetry concept of Newcomb, and the congruity principle of Osgood and Tannenbaum. Common to these concepts is the notion that a person tends to organize his thoughts, beliefs, attitudes, and behaviors in meaningful ways.

Heider developed the balance principle in terms of the attitu-

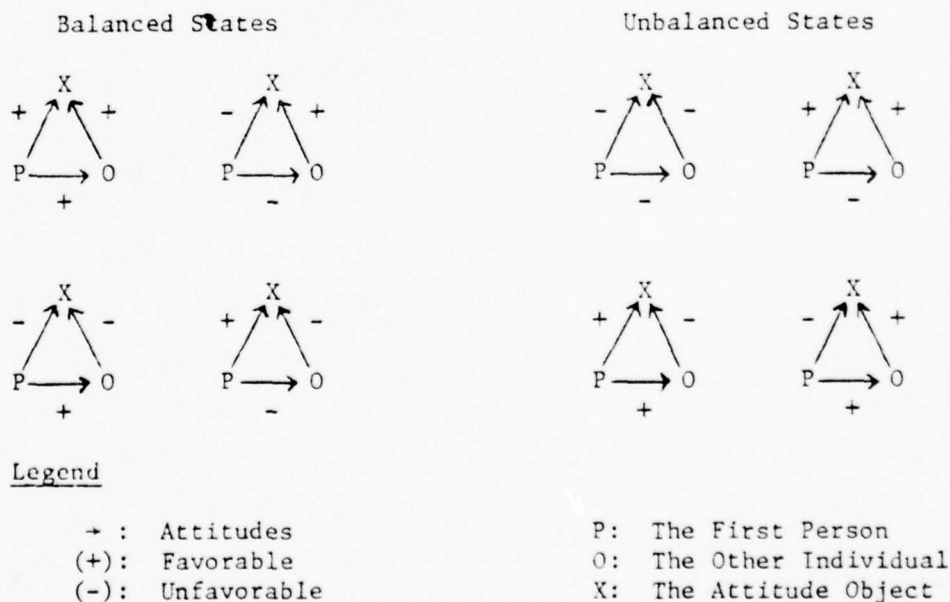
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<sup>21</sup>Robert B. Zajonc, "The Concepts of Balance, Congruity and Dissonance," Public Opinion Quarterly XXIV, no. 2 (1960): 280-296.



dinal relations thought to exist between two persons and an object. The principle assumes that the first person P has attitudes toward a second person O and toward the object X that are either favorable or unfavorable. If all three attitudes are favorable, or if any two are unfavorable and the third is favorable, a condition of balance is said to exist. Imbalance exists if all three attitudes are unfavorable, or if any two attitudes are favorable and the third is unfavorable. The balance principle holds that an unbalanced situation produces psychological tension to restore balance.<sup>22</sup> Figure 3-2 shows the possible balanced and unbalanced states for P that may exist.

Fig. 3-2. Balanced and Unbalanced States



<sup>22</sup>F. Heider, "Attitudes and Cognitive Organization," Journal of Psychology XII (1946): 197-112.

The balance principle does not consider either the strength of the attitudes held in the situation or the direction of any attitude change. Also, the means used to restore balance are not specified. However, this balance paradigm was utilized by both Newcomb and Osgood and Tannenbaum.

Newcomb based his approach to the study of interpersonal relationships on the unbalanced states in Heider's concept and specified communication as a potential means to achieve balance. He postulates that in unbalanced states there is a "strain toward symmetry" or communality. He considered P as oriented toward both O and X, and the degree of strain as a function of any discrepancy between attitudes held by P toward O and X. This strain may be reduced through communication between P and O. This concept involves both persons directly and hence suggests that relationships between persons relative to the object may be affected by communication.<sup>23</sup>

Osgood and Tannenbaum developed their congruity principle as an extension of the balance principle by utilizing communication as a means to achieve balance. This principle predicts the direction and extent of attitude change when P, holding attitudes or evaluations concerning O and X, is confronted with an assertion (that is a message or signal) made by O regarding X. This congruity principle holds that any changes in the evaluations of O and X held by P are always in the direction of increased congruity within the prevailing frame of reference. That is, if the assertion is congruent with present

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<sup>23</sup>Theodore M. Newcomb, "An Approach to the Study of Communicative Acts," Psychological Review LX (1953): 393-404.

attitudes, a stable or balanced state exists. If the assertion is incongruent, imbalance exists, and either or both attitudes will change as necessary toward congruency and balance.<sup>24</sup> Zajonc notes there is a good deal of empirical evidence supporting the predictions of the congruity principle.<sup>25</sup>

#### Analysis of Outcomes

The outcomes of Becker and Green can be readily cast in terms of the balance paradigm for analysis. In a simplified context, if P is one subordinate, O is another subordinate, and X is the set of management's goals or budget, then attitudes are depicted as follows. The attitudes held by P toward O are symbolized by  $P \rightarrow O$ , the attitudes held by P toward X as  $P \rightarrow X$ , and the attitudes held by O toward X as  $O \rightarrow X$ . These relationships create the balance paradigm components viewed from P's perspective.

The possible directions of each attitude are drawn from the Becker and Green description of the outcomes. High cohesiveness, or individual attraction to the group, suggests positive attitudes held by P toward O, depicted now as  $P \overset{+}{\rightarrow} O$ . Low cohesiveness suggests  $P \overset{-}{\rightarrow} O$ . Becker and Green discuss participant goal acceptance directly in terms of positive attitudes, depicted as  $P \overset{+}{\rightarrow} X$ , and  $O \overset{+}{\rightarrow} X$ , and depressed production in terms of negative attitudes, or  $P \overset{-}{\rightarrow} X$  and  $O \overset{-}{\rightarrow} X$ .

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<sup>24</sup>Charles E. Osgood and Percy H. Tannenbaum, "The Principle of Congruity in the Prediction of Attitude Change," Psychological Review LXII (1955): 42-55.

<sup>25</sup>Zajonc, "Concepts of Balance, Congruity and Dissonance," pp. 9-10.

The attitude components and possible directions are summarized in figure 3-3. Each attitude component and its direction in the balance paradigm within the cells of the matrix correspond to the process-content interaction forming the cell. Then, in terms of the balance principle the state of each outcome is classified as either balanced or unbalanced. If a balanced state, the outcome is considered a valid possibility in terms of consistency theory. If an unbalanced state, the outcome is considered unlikely and the use of the congruity principle theoretically determines the direction of attitude changes necessary to achieve a balanced state.

Cell A of figure 3-3 depicts the outcome of low cohesiveness and negative attitudes as unbalanced. Thus it is an unlikely end result from participation. According to the congruity principle, communication should create a change in either or both attitudes, from P's perspective, to a positive direction to achieve balance. If  $P \rightarrow O$  changes, increased cohesiveness results. If  $P \rightarrow X$  changes, goal acceptance occurs.

Cell B depicts the outcome of low cohesiveness and positive attitudes as unbalanced. Accordingly, it is also considered unlikely as an end result of participation. As Becker and Green state that this outcome is unlikely, their viewpoint is confirmed by consistency theory. If  $P \rightarrow O$  changes, increased cohesiveness results, and a  $P \rightarrow X$  change results in a shift to goal rejection in terms of the predicted changes possible from the congruity principle for this outcome.

The consistency prediction that the low cohesiveness outcomes depicted in Cells A and B are unlikely supports the Becker and Green



Fig. 3-3. The Becker and Green Process-Content Interactions in a Balance Paradigm Context

		Process Leads To	
		Cohesiveness:	
		Low	High
Analysis of Content Leads To Attitudes Concerning Management's Goal	Negative	<u>Cell A</u>  (Outcome 3) (Unbalanced)	<u>Cell C</u>  (Outcome 4) (Balanced)
	Positive	<u>Cell B</u>  (Outcome 2) (Unbalanced)	<u>Cell D</u>  (Outcome 1) (Balanced)

view that increased cohesiveness can easily result from participation. Thus, to the extent the predictions of consistency theory hold, the examination of questions related to subordinate attitudes in participative budgeting need not be primarily concerned with whether more favorable subordinate attitudes toward each other result.

Cell C depicts the high cohesiveness and negative attitude outcome as a balanced state. Therefore it is a likely result in terms of consistency theory. Shaw summarizes the empirical evidence supporting this possibility.<sup>26</sup> Reported studies generally demonstrate that high cohesive groups are much more effective in achieving goals they set for themselves than are low cohesive groups. However, there is no guarantee that the group goals are the same as management's. Becker and Green note that this outcome is most conducive to a production slowdown.

Cell D depicts the high cohesiveness and positive attitude outcome as a balanced state. Therefore it is also a likely result. The Cell D outcome is the successful participation condition, but it is not clear whether it is more or less likely than the outcome depicted in Cell C. Thus, in contrast to subordinate attitudes toward each other, the questions related to subordinate attitudes toward the budget, in terms of consistency theory predictions, appear to be the primary concern. Given that both of the high cohesiveness outcomes are balanced, the question becomes whether more or less favorable subordinate attitudes toward the budget result from participative

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<sup>26</sup>Marvin E. Shaw, Group Dynamics: The Psychology of Small Group Behavior, 2d ed. (New York: McGraw-Hill, Inc., 1976), pp. 205-208.

budgeting. Thus, this question is one addressed by the empirical effort in this study.

The Becker and Green discussion does not specify the precise nature of the subordinate attitudes toward the budget as their conceptual development focuses on the linkage of goal acceptance with increased aspiration levels. For this reason, attitudes toward the budget are drawn from the research reviewed in the previous chapter.

#### Subordinate Attitudes Toward the Budget

The present study investigates whether the following subordinate attitudes toward the budget are more favorable as a result of participative budgeting; satisfaction with the budget, commitment to the budget, and perceived correctness of the budget.

The satisfaction with the budget or other decisions made has been the major attitude investigated in prior research. Heller noted senior level managers reported satisfaction of their subordinates as a major reason for the use of participation and the field studies of Morse and Reimer, Vroom, Milani and Swieringa and Moncur all found aspects of satisfaction positively related to participation.<sup>27</sup>

Several laboratory studies of participation included satisfaction as a dependent measure. Hoffman and Maier found individual satisfaction was related to perceived influence on the outcomes of

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<sup>27</sup>Heller, Managerial Decision-Making; Morse and Reimer, "Experimental Change of a Major Organizational Variable;" Vroom, Some Personality Determinants of the Effects of Participation; Milani, "Participation in Budget-Setting;" Swieringa and Moncur, "The Relationship Between Managers' Budget-Oriented Behavior and Selected Measures."

group decisions on several problem tasks.<sup>28</sup> Cherrington and Cherrington used a satisfaction measure to assess the results of their participative budgeting experiment as well as a subsequent performance measure.<sup>29</sup> Foran and DeCoster utilized a satisfaction dimension in their dependent measure. They developed a commitment factor including the dimensions of willingness to change, perceived correctness, and perceived satisfaction to assess the effects of participation on acceptance of a standard. The satisfaction dimension achieved the highest loading on the factor, but Foran and DeCoster found no significant effects of the opportunity to participate in communication networks on the commitment dimension.<sup>30</sup>

The subordinate commitment and perceived correctness attitudes are drawn from an examination of the commitment factor in the Foran and DeCoster research. Foran and DeCoster point out that the limited number of observations in their study did not meet the recommended test for the use of factor analysis and their test instrument was new.<sup>31</sup> This suggests that the satisfaction, perceived correctness, and commitment dimensions of the factor may be viewed separately.

The question of whether more favorable subordinate attitudes result from participative budgeting raises the question of how this

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<sup>28</sup>L. Richard Hoffman and Norman R. E. Maier, "Quality and acceptance of problem solutions by members of homogeneous and heterogeneous groups," Journal of Abnormal and Social Psychology LXII, no. 2 (1961): 401-407.

<sup>29</sup>Cherrington and Cherrington, "Appropriate Reinforcement Contingencies in the Budgeting Process."

<sup>30</sup>Foran and DeCoster, "An Experimental Study of the Effects of Participation," pp. 760-762.

<sup>31</sup>Ibid.



phenomenon occurs. Becker and Green propose that a participant's analysis of the content of the process will enable him to see that the goal is accepted by the others in the group.<sup>32</sup> As this content consists of the information exchanged in the planning function phases, the means to assess the effects of interactive communication on participant analysis is discussed below. This analysis is then related to the attitudes toward the budget.

#### Communication Effects on Subordinate Attitudes

Given the interactive communication of participative budgeting, the McLeod and Chaffee coorientation model is considered appropriate to assess the effects of this communication.<sup>33</sup> The essence of this model is a series of relationships between individuals concerning the object of communication and each other. This model is discussed below in terms of the information exchanged in the phases of the planning function. This discussion forms the basis to utilize the coorientation relationships to hypothesize how subordinate attitudes toward the budget result from the allowed interactive communication in participative budgeting.

#### The Coorientation Model

The coorientation model expands the balance principle discussed earlier to consider both individuals simultaneously. This expansion allows the development of relationships between individuals that may

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<sup>32</sup>Becker and Green, "Budgeting and Employee Behavior," p. 397.

<sup>33</sup>McLeod and Chaffee, "Interpersonal Approaches to Communication Research."

be affected by communication between them.

### Concept

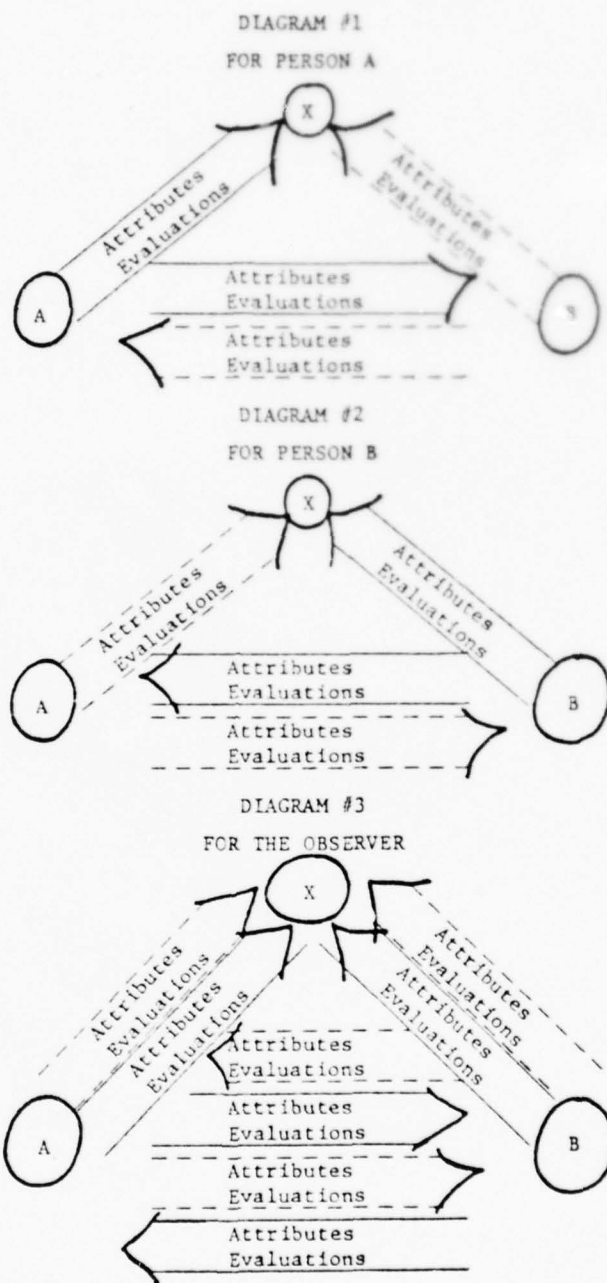
The coorientation concept in a participative budgeting context utilizes an object "X" as the budgeting situation, person "A" as management, and person "B" as the subordinate. The description changes the earlier balance paradigm labels of P and O to A and B since both persons are simultaneously considered in this model. The management-subordinate relationship depicts the participants in the budgeting process. Figure 3-4 presents a sequence of diagrams to outline the coorientation concept.<sup>34</sup>

Diagram 1 in figure 3-4 depicts person A. A is assumed to have the following perceptions in this budgeting situation. First, A perceives facts or attributes concerning the budgeting situation X. For example, A determines that \$1,000 is available for operations this period. Secondly, A perceives evaluations about the budgeting situation facts. For example, A may think that \$1,000 is insufficient for the coming period. Thirdly, A perceives facts or attributes concerning the other person B. For example, A knows B is his subordinate. Finally, A perceives evaluations about B. For example, A thinks B is the poorest performing subordinate working for him. In Diagram 1, the solid arrow from A to X contains the facts or attributes and the evaluations concerning the budgeting situation. The solid arrow from A to B contains the facts or attributes and evaluations concerning B from A's perspective.

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<sup>34</sup>Ibid., p. 480.

Fig. 3-4. The Co-orientation Concept



Solid arrows are an individual's own perception sets.  
Dashed arrows are one individual's estimates of the other individual's perception sets.

The coorientation concept further assumes that A can estimate the same perceptions that he holds in the budgeting situation for the other person B. Diagram 1 shows these estimates of B's perceptions by A as the dashed arrows.

Diagram 2 depicts person B. The same sequence of perceptions is assumed for B. Since both A and B are assumed to have perceptions concerning the budgeting situation, A and B are said to be cooriented to the budgeting situation. An observer outside this system sees the budgeting situation and the participants as displayed in Diagram 3. The observer can see the status of the attributes and evaluations, both actual and estimated, held by each participant, and importantly, can see the effects of any changes in the system which may be created by communication between A and B.

#### Measurement Model

McLeod and Chaffee construct a measurement model from the coorientation concept based on matching certain of the attributes and evaluations held by individuals as displayed in Diagram 3.<sup>35</sup> The relationships of interest for this study involve the attributes and evaluations held by participants concerning the budget.<sup>36</sup> Figure 3-5 displays this measurement model in terms of these budgeting related attributes and evaluations.

The matchings or relationships in the measurement model are considered variables. As shown in figure 3-5, the attributes of

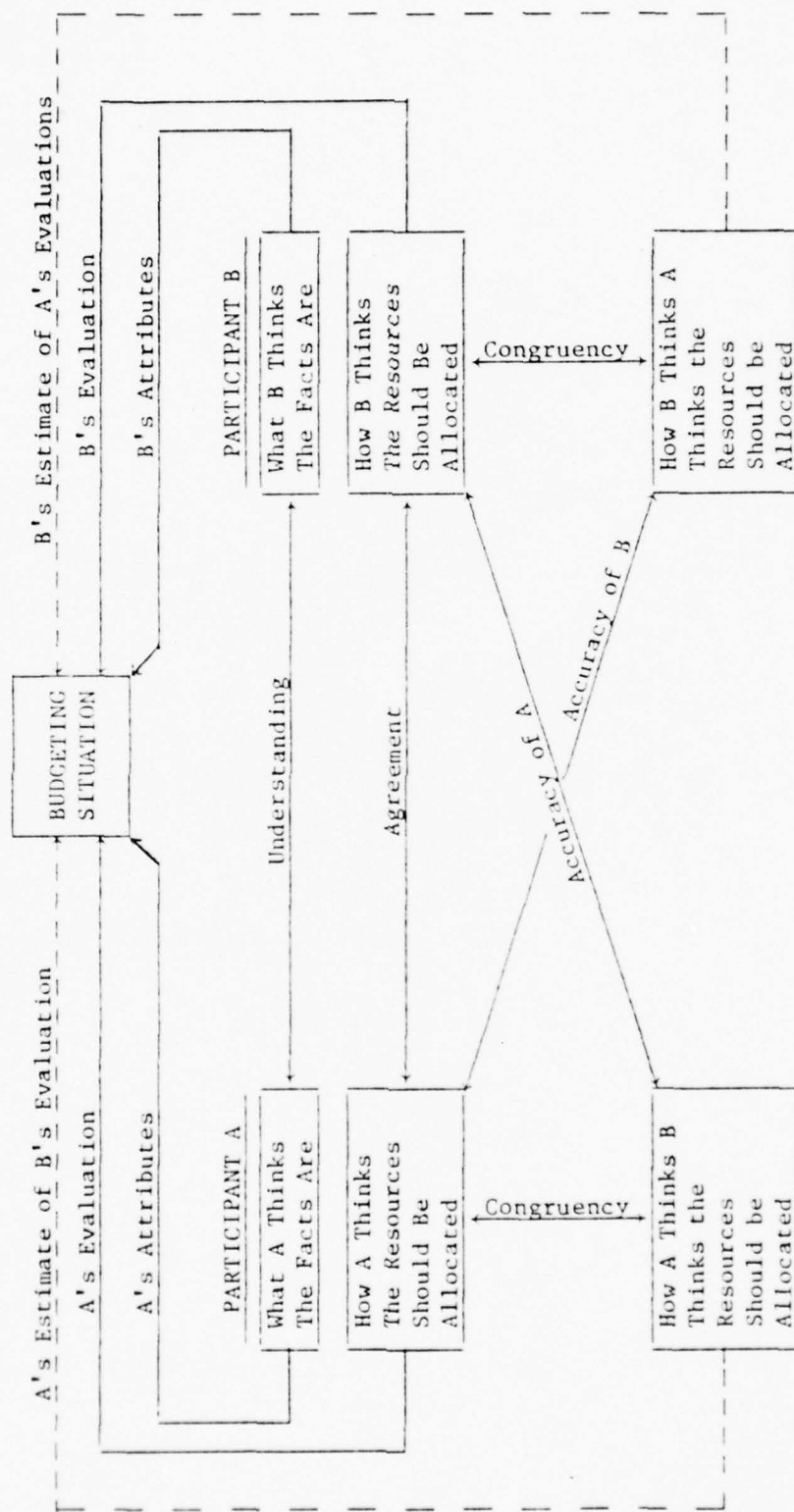
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<sup>35</sup> Ibid., p. 484.

<sup>36</sup> The consideration of participant attributes and evaluations relative to each other may prove to be a means to assess cohesiveness questions in subsequent research.



Fig. 3-5. The Co-orientation Measurement Model in a Participative Budgeting Situation



each participant are characterized by what each thinks the facts of the budgeting situation are. The evaluations are characterized by how each thinks the resources available in the budgeting situation should be allocated. The specific matchings or relationships as variables are shown by the dual pointed arrows. The matching of A's and B's attributes is considered understanding. The matching of A's and B's evaluations is termed agreement. The matching of A's own evaluation with his estimate of B's evaluation is considered congruency for A. Congruency for B is constructed similarly. The matching of A's estimate of B's evaluation with B's actual evaluation is termed accuracy for A. Accuracy for B is constructed similarly.

The effects of communication on these attribute and evaluation based relationships can be assessed by observing the state of these relationships, exposing the system to communication, and measuring the extent of any changes. In terms of the content of discussion topics of the phases of the participative budgeting model, attributes are the budgeting problem data discussed in the orientation phase, evaluations are the alternative resource allocation plans identified and analyzed in the evaluation phase, and are also the basis for an alternative selection in the joint-decision making phase. Thus, to the extent effective communication occurs between management and subordinates in the budgeting process, its effects on the participant attributes and evaluations can be measured in terms of any changes in the coorientation measurement model relationships. Given the explicit linkage between these relationships and the content of the planning function phases, these coorientation measurements are con-

sidered an appropriate means to assess participant analysis of that content.

### Participant Analysis of the Content

The effect of communication on participant analysis of the content is hypothesized to occur in the phase or phases of the participative budgeting model where the communication initiated by management specifically relates to the attributes and evaluations comprising the variables used to assess the participant analysis. The discussion below outlines the specific changes hypothesized for each coorientation variable over the participative budgeting model phases. The changes in the orientation phase are contrasted to a budgeting situation where no interactive communication is allowed by management. The changes in the evaluation phase are then contrasted to those in the orientation phase, and the changes in the joint decision making phase to those in the evaluation phase.

#### Orientation

In the orientation phase, the content is the discussion topic of the facts of the budgeting situation. Thus, the communication initiated by management concerns attributes of the situation held by participants. Understanding is the only coorientation variable based on a matching of attributes, so participants may achieve a significantly greater understanding of the budgeting situation in this phase relative to individuals in a no participation setting. No changes in the other variables are expected since these measures are based on evaluations held by participants and the discussion does not

involve these evaluations.

McLeod and Chaffee note that the effect of communication on understanding has not been investigated much in the literature. They explain that some theorists view understanding as a criterion to determine whether communication really occurred. That is, a measure of understanding is used to determine whether one person really established a signal in the mind of another. Others theorize that understanding is necessary before other outcomes can result from communication. If two persons share neither the same comparison objects (that is, are not cooriented) nor the attributes concerning these objects, other outcomes cannot result from communication.<sup>37</sup> This intervening role of understanding is the view adopted in the present study. That is, understanding is considered part of the subordinate analysis of the content, rather than the end result of communication.

#### Evaluation

In the evaluation phase, the content is the discussion topic of searching for and evaluating alternative resource allocation plans for the budgeting situation. As discussed in the development of the model, subordinate involvement in this phase implies that they were also involved in orientation. Thus discussion concerning attributes must occur prior to discussion of evaluations to be consistent with the model, and accordingly, the results for understanding expected in orientation should obtain in the evaluation phase as well.

The variables of accuracy, congruency, and agreement are based

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<sup>37</sup> McLeod and Chaffee, "Interpersonal Approaches to Communication Research," p. 486.



on the appropriate matchings of actual and estimated evaluations held by participants as depicted in Figure 3-5. To the extent evaluations are discussed in this phase, changes in these variables may result as both actual and estimated evaluations may be affected by communication. On the other hand, McLeod and Chaffee argue that, inasmuch as evaluations are the products of so many kinds of individual experiences, they are unlikely to be changed very much by communication alone.<sup>38</sup>

Accuracy should be achievable through communication alone as it requires only the exposure of evaluations. Wackman points out that the research results of information exchange studies in small groups support the proposition that communication increases accuracy.<sup>39</sup> Therefore a significant increase in accuracy in perceiving other participant's evaluations is hypothesized to occur in this phase relative to the orientation phase and a no participation setting.

Congruency, in contrast to agreement and accuracy, is an intrapersonal variable and the effects of communication on congruency are indirect. Given these conditions, McLeod and Chaffee note that the effects of communication on congruency are difficult to predict.<sup>40</sup> Since both actual evaluations toward the budgeting situation and the estimates of the other participants' evaluations may change, the best

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<sup>38</sup> Ibid.

<sup>39</sup> Daniel B. Wackman, "Interpersonal Communication and Coordination," American Behavioral Scientist XVI, no. 4 (1973): 544.

<sup>40</sup> McLeod and Chaffee, "Interpersonal Approaches to Communication Research," p. 485.

prediction for congruency is from consistency theory. Any change that occurs is toward balance or increased congruity relative to other attitudes held. Thus, by itself, any specific change in congruency is difficult to predict.

Agreement is not likely to result from communication alone, since one or the other participants would have to change evaluations if these were any disagreements initially. A substantial body of communication research in the area of persuasion has assessed the issues related to attitude change. As discussed in the previous chapter, persuasion is communication intended to modify the intended receiver's attitudes or behaviors in some predetermined manner. Wackman notes that research in persuasion has dealt with factors such as characteristics of source-receiver relations (for example; credibility, power), characteristics of messages (for example; primacy, recency, semantics, active-passive verbs), and characteristics of receivers (for example; sex, intelligence).<sup>41</sup> Thus, the potential factors affecting agreement are many and complex. Accordingly, increased agreement is hypothesized to result from the interactive communication in this phase relative to the orientation phase and the no participation setting to the extent one participant persuades, or is persuaded by, another participant.

McLeod and Chaffee note that these evaluation based variables are quite likely to be interrelated among themselves.<sup>42</sup> Since

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<sup>41</sup>Wackman, "Interpersonal Communication and Coorientation," pp. 541-542.

<sup>42</sup>Jack M. McLeod and Steven H. Chaffee, "The Construction of Social Reality," The Social Influence Processes, ed. by J. Tedeschi (Chicago: Aldine-Atherton, 1972), p. 64.

communication may affect both the actual and estimated evaluations held by participants, and if so, does it simultaneously, the simultaneous changes among the evaluation based variables are difficult to predict. However, if any two move in given directions, the third can be predicted, or if one is held constant, effects of communication on the other two can be determined. Thus, while a change in congruency is difficult to predict by itself, increases in accuracy and agreement will result in corresponding increase in congruency.

#### Joint Decision Making

In this phase, the content is the same discussion topic as in the evaluation phase. Accordingly, the same results for understanding accuracy, congruency, and agreement in the evaluation phase should also occur in this phase.

The only difference between the joint decision making and evaluation phases is that consensus is reached among participants on the final budget. Consensus may be the capstone required in the process to lead to significant changes in the evaluation based variables if such changes do not result in the evaluation phase. This effect is suggested by the Bales and Strodtbeck model description of the interactions in the control phase.<sup>43</sup> On the other hand, increases in these variables may not result as consensus is not the same as agreement or congruency. Chaffee and McLeod point out consensus may be conformity inasmuch as:

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<sup>43</sup>Bales and Strodtbeck, "Phases in Group Problem Solving," p. 487.

Conformity can take place for a variety of reasons, including purely instrumental acquiescence without any corresponding changes in cognitive structure. A person, in other words, can publicly conform to a group standard without privately believing that what he is doing corresponds to a veridical perception of reality.<sup>44</sup>

Thus while a person may publicly conform, the coorientation variables of congruency and agreement may indicate that the individual's real perceptions in the situation are quite different.

#### Subordinate Content Analysis and Budget Attitudes

Given the focus on subordinate attitudes toward the budget as a hypothesized result of participation, the coorientation variables that represent the subordinate analysis of the content of the participative budgeting process are hypothesized to be positively related to more favorable subordinate attitudes toward the budget. Since the coorientation variables are explicitly linked to the appropriate content of the planning function phases, if these significant relationships do emerge, a mechanism through which the more favorable attitudes result is established by the coorientation model. The more attributes are shared (evidenced by increased understanding), the more common the basis among participants to proceed to evaluating the situation. The more correctly a subordinate perceives other participants' evaluations (increased accuracy); the more he thinks the other participants evaluate the situation as he does (increased congruency); and the more he in fact evaluates the situation the same way as other participants (increased agreement), the more likely

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<sup>44</sup>McLeod and Chaffee, "The Construction of Social Reality," p. 58.



he will think the budget is correct, be committed to it, and be satisfied with it.

The hypotheses concerning whether more favorable subordinate attitudes toward the budget and how these attitudes result from participative budgeting are summarized in figure 3-6. Since the coorientation variables are hypothesized to lead to the more favorable attitudes, the attitude results are hypothesized to occur in the same phase or phases of the budgeting process as the changes in the coorientation variables.

#### Summary

In this chapter, a general participative budgeting model is developed in terms of an interactive communication process and hypotheses are constructed as a basis for an empirical test of some of the effects of this model operation. By incorporating the suggestions of the prior research and basing the model on well established budget related concepts, a strong conceptual foundation is provided for consideration of the communication process as the explicit linkage between the activity of participative budgeting and its effects.

The model is seen as generally applicable to any budgeting situation. While any particular situation is likely to be unique, the budgeting model includes a well-known general approach to analyzing the situation while the alternative decision styles within the model afford management a flexible approach to initiating the participation with subordinates to develop the budget.

The hypotheses concerning the effects of the participative

Fig. 3-6. Summary of Study Hypotheses

## HYPOTHESES CONCERNING OUTCOMES FROM PARTICIPATION:

Participation as Allowed Interactive Communication in:	Is Hypothesized To Lead To Greater:	Than:
Joint Decision Making or Evaluation (To the Extent Persuasion Occurs)	Satisfaction Commitment Perceived Correctness Accuracy Agreement and Congruency Congruency (Because of Accuracy and Agreement)	Orientation or No Participation
Joint Decision Making Evaluation Orientation	Understanding	No Participation

## HYPOTHESES CONCERNING RELATIONSHIPS AMONG THESE OUTCOMES:

Increased:	Is Hypothesized To Be Related To Increased:
Understanding	Accuracy Congruency Agreement
Accuracy Congruency Agreement	Satisfaction Commitment Perceived Correctness

budgeting process are limited to questions concerning subordinate attitudes toward the budget. This limited focus is due to the inherent complexity of the budgeting process itself and the broad range of questions suggested by the assumptions underlying the rationale for the use of participative budgeting. Thus, the empirical effort of the study investigates only whether more favorable subordinate attitudes toward the budget result from participative budgeting and how such attitudes result from this process. Also, this effort places major emphasis on the effects of interactive communication on subordinate attitudes and only limited attention is given to the operation of interactive communication within the participative budgeting model itself. Reliance is placed on the established concepts of budget, budgeting, planning, and communication underlying the model. By contrast, the Becker and Green outcomes based on their participation concept, which also underly the model, have not been tested in a budgeting context. Also, Foran and DeCoster found no significant effects related to communication networks in their budgeting related study. Thus the effects of the process are considered the appropriate focus.

In the next chapter, the experimental design and methodology establish a budgeting situation in terms of upper levels of an organization. The participant roles in the process are from the top two levels of a typical organization structure. Since the budget is top management's plan, top management is always involved as one participant. Which subordinates to involve is ultimately a managerial policy decision, but one which may be guided by the results of this

and similar studies. As this experiment is the initial investigation of the model, the logical approach is considered to limit the participative budgeting process to two adjacent levels in a typical organization. Then the conclusions of this study may be used as the basis to develop further studies involving other levels to provide results that may prove useful for managerial decisions concerning the use of the participative budgeting process.

## CHAPTER FOUR

### EXPERIMENTAL DESIGN AND METHODOLOGY

The purpose of this chapter is to describe the design and methodology employed in the experimental test of the hypotheses developed in the previous chapter. The test involves laboratory sessions with allowed interactive communication as the experimental treatment in a simulated budgeting situation involving the upper levels of an organization. The experimental procedures conform to the elements of a post test only, control group design. Because internal validity is of primary concern, the first section of the chapter focuses on the validity requirements for the experimental design and discusses those aspects of the methodology fulfilling these requirements. The second section describes the sequence, procedures, materials, and instruments comprising the methodology of the experiment.

#### Design

Since the purpose of the experiment is to test the hypotheses of the study, the design must ensure that the interactive communication allowed as the experimental treatment in fact made the difference in this specific situation. Campbell and Stanley note that internal validity is the basic minimum without which any experiment is uninter-



pretable.<sup>1</sup> They identify eight classes of extraneous variables which, if not controlled for, would otherwise produce effects confounded with the effects of the experimental treatment. These variables represent the effects of:

History, the specific events occurring between the first and second measurement in addition to the experimental variable.

Maturation, processes within the respondents operating as a function of the passage of time per se (not specific to the particular events), including growing older, growing hungrier, growing more tired, and the like.

Testing, the effects of taking a test upon the scores of a second testing.

Instrumentation, in which changes in the calibration of a measuring instrument or changes in the observers or scorers used may produce changes in the obtained measurements.

Statistical regression, operating where groups have been selected on the basis of extreme scores.

Biases resulting in differential selection of respondents for the comparison groups.

Experimental mortality, or differential loss of respondents from the comparison groups.

Selection-maturation interaction, or similar effects which might be mistaken for the effects of the experimental variable.<sup>2</sup>

The specific nature of each effect indicates that a proper experimental treatment can minimize the effects of history; proper subject selection and utilization can reduce the probability of statistical regression and bias; an appropriate experimental task can minimize the effects of maturation and mortality; and appropriate

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<sup>1</sup>Donald T. Campbell and Julian C. Stanley, Experimental and Quasi-Experimental Designs for Research (Chicago: Rand McNally College Publishing Company, 1963), p. 5.

<sup>2</sup>Ibid.

instrument design and use can minimize instrumentation and testing effects. The discussion below details the aspects of the methodology employed to minimize the possibility of these effects confounding any obtained results.

### The Experimental Treatment

The experimental treatment is participation as allowed interactive communication. If this and only this communication occurs, the observed results in the experiment can be explicitly linked to the treatment. To ensure this linkage, a control group and treatment groups are used in the experiment. The control group does not receive the experimental treatment, that is, no participation as interactive communication occurs. Three groups receive an experimental treatment. This treatment is given at three levels corresponding to the phases of the participative budgeting process as follows:

Orientation - Individual members meet as a group and communication is allowed to the extent of discussing the facts of the budgeting situation. The manager limits the communication to these facts. Then the manager makes the resource allocation decision and informs the subordinates of the budget decision made.

Evaluation - Individual members meet as a group and communication is allowed to the extent of discussing both the facts of the budgeting situation and individual evaluations concerning alternative resource allocations. The manager limits the communication to these topics. Then the manager makes the resource allocation decision and informs the subordinates of the budget decision made.

Joint Decision Making - In addition to the communication allowed on the topics at the evaluation level, the group at this level jointly makes the decision on resource allocation.

By contrast, the manager makes the resource allocation decision alone and imposes it on the control group.

The linkage between the interactive communication treatment and the results exists if the results obtain in the treatment groups and not the control group. If the results occur in the control group along with the treatment groups, then interactive communication cannot be said to be the cause of any observed results.

### Subjects

Procedures for subject selection and assignment to conditions in the experiment have important implications for internal validity concerning statistical regression and bias effects. A sample representative of the population minimizes the possibility for statistical regression. Random assignment of subjects to experimental conditions is considered by Campbell and Stanley as the most adequate assurance of lack of initial bias between groups.<sup>3</sup> Also, McLeod and Chaffee note that the balance paradigm underlying the coorientation concept views the individuals on equal footing. However, differing roles, purposes, prior experiences, and communication potential mean that the individuals should be expected to hold somewhat different perceptions of the coorientational situation. They likewise suggest an approach to control for this asymmetry is random assignment of persons to experimental conditions.<sup>4</sup>

The present experiment utilizes students as subjects. The only requirement for student volunteers was either senior or graduate student status in business administration. Thus, the possibility of

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<sup>3</sup>Ibid., p. 15.

<sup>4</sup>McLeod and Chaffee, "Interpersonal Approaches to Communication Research," pp. 489-490.

statistical regression effects is considered minimal, as no selection criterion based on extreme scores or qualifications was utilized. Also, as described later in the methodology, students were randomly assigned to the experimental conditions to preclude the effects of any bias.

#### The Experimental Task

Birnberg and Nath discuss four characteristics of importance for the experimental task:

1. Mental or physical skills required
2. Intrinsic interest in the task
3. Subject's familiarity with the task prior to the experimental situation
4. The level of difficulty of the task<sup>5</sup>

These characteristics suggest that the task and the subject must be compatible. Utilization of students as subjects suggests that the task should require mental skills, be problem-oriented, and be at a level of difficulty and familiarity consistent with the capabilities of the student population represented in the sample.

The task must also be consistent with the participative budgeting model. Thus, the task must allow for varying interactive communication in a budgeting situation and result in the adoption of a resource allocation plan.

An appropriate task can reduce the dangers of maturation and experimental mortality effects. One would expect that reasonably

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<sup>5</sup>Jacob B. Birnberg and Ragan Nath, "Laboratory Experimentation in Accounting Research," The Accounting Review XLIII, no. 1 (1968): 38-45.

appropriate time requirements and level of difficulty and the intrinsic interest of an appropriately selected task minimize the occurrence of any significant maturation processes and any subject withdrawal during the experiment.

Given the multiple considerations for the experimental task, a specific task was developed for this study utilizing the IBM Management Decision Game.<sup>6</sup> The game itself involves participants taking roles in a simulated organization which operates in a three industry economy. Each industry is oligopolistic and contains three firms. The objectives of each organization in the game are to maximize its profits and its share of the industry market each period of play. Participants decide how much of the available resources should be allocated to production, marketing, and research activities each period, and what prices to set in each market.

The task, described in more detail later, is based on this game for the following reasons. First, the game is a learning tool and has been used in both industry and higher education.<sup>7</sup> Thus, the game is generally suited to the student population utilized.

Secondly, the game is flexible. A wide variety of situations can be developed with the mathematical models comprising the game. Further, the amount of information provided participants can be varied. Thus, both the level of difficulty and the time required to play the game, or parts of the game, can be geared directly to the student

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<sup>6</sup>IBM Management Decision Making Laboratory (White Plains, N.Y.: International Business Machines Corporation, 1963).

<sup>7</sup>Ibid., p. 1.



subjects.

Thirdly, the game involves participants making decisions concerning the planned allocation of resources for the upcoming time period. Thus the game setting corresponds to the participative budgeting model in that the multiple participant roles involve decision making and can be cast in an interactive communication context.

A decision making task has not been used in prior laboratory research in participative budgeting. Cherrington and Cherrington used a physical task of paper model construction and the related mental task of estimating the production standard for the physical task.<sup>8</sup> Foran and DeCoster utilized a standard setting context, consisting of estimating completion times for building a candy house kit, making paper flowers, assembling a cube, and arranging geometric forms.<sup>9</sup> However, Foran notes:

There is some question as to whether we should have used a standard setting paradigm. An information processing or decision making paradigm might have been better.<sup>10</sup> (emphasis added)

Thus, the use of this decision making task expands the range of situations operationalized for the examination of participative budgeting.

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<sup>8</sup>Cherrington and Cherrington, "Appropriate Reinforcement Contingencies in the Budgeting Process," p. 233.

<sup>9</sup>Foran and DeCoster, "An Experimental Study of the Effects of Participation," p. 757.

<sup>10</sup>Michael Foran, "An Experimental Study of the Effects of Participation, Authoritarianism and Feedback on Cognitive Dissonance in a Standard Setting Situation: A Reply," The Accounting Review LII, no. 3 (1977): 762-764.

### Test Instruments

Appropriate instrument development and use can minimize the effects of instrumentation and testing. Changes in the instruments that produce the instrumentation effect are avoided in the present experiment by the use of pretested instruments drawn from the IBM game procedures and rules. The instruments thus correspond to the activities required in the experimental task. Because of this correspondence, however, successive uses of these instruments in the same session are likely to produce a testing effect. That is, the use of any of the test instruments before the experimental task would likely make subjects sensitive to the instruments, such that they may concentrate on the instrument related items during the task. Then a use of the test after the task would be biased by this sensitivity. Campbell and Stanley consider a post-test only use of the instrument appropriate in this type of situation.<sup>11</sup> Thus, this approach is adopted to avoid the possibility of the testing effect.

### The Post-Test Only, Control Group Design

Among the various aspects of the experiment discussed above are the needs for the experimental treatment to involve several conditions for varying interactive communication, the subjects to be randomly assigned to these conditions, and a post-test only use of the instrument. These needs can be incorporated into a post-test only, control group design. Campbell and Stanley point out that this design allows

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<sup>11</sup>Campbell and Stanley, Experimental And Quasi-Experimental Designs for Research, p. 26.

for the control of all sources of internal validity.<sup>12</sup>

The specific design employed is of the following form:<sup>13</sup>

CONDITION 1:	R	X <sub>1</sub>	O <sub>1</sub>
CONDITION 2:	R	X <sub>2</sub>	O <sub>2</sub>
CONDITION 3:	R	X <sub>3</sub>	O <sub>3</sub>
CONDITION 4:	R	X <sub>4</sub>	O <sub>4</sub>

where

Condition 1 is the control group;  
 Conditions 2-4 are the experimental treatment groups;  
 R is the random assignment of subjects to the four conditions;  
 X<sub>1</sub> is the control, or no treatment;  
 X<sub>2</sub> is the experimental treatment of the orientation phase;  
 X<sub>3</sub> is the experimental treatment of the evaluation phase;  
 X<sub>4</sub> is the experimental treatment of the joint decision making phase;  
 O<sub>1,2,3,4</sub> are observations made by a post test in each condition of the experiment.

These conditions, treatments, and observations are described below in the methodology of the experiment.

#### Methodology

The experiment involves materials and test instruments developed from the IBM Management Decision Game utilized over the four conditions. Figure 4-1 displays an overview of the laboratory sessions comprising the experiment.

As shown in figure 4-1, each laboratory session consists of four major steps. The first step establishes the setting for the

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<sup>12</sup>Ibid., pp. 25-27.

<sup>13</sup>This design is based on the general form of design 6 described by Campbell and Stanley, Experimental and Quasi-Experimental Designs for Research, pp. 25-27.

Fig. 4-1. Overview of Laboratory Session

STEP	SETTING	CONDITIONS--THE INDEPENDENT VARIABLE	MEASUREMENT OF COMMUNICATION EFFECTS	MEASUREMENT OF SUBORDINATE ATTITUDES
Event:	Subjects receive general information packet and 5 year financial history to create budgeting situation.	Subject randomly assigned to one of the following conditions: 1--No participation 2--Orientation 3--Evaluation 4--Joint Decision Making and assumes assigned responsibilities.	Subject attributes and evaluations obtained to measure: --Understanding --Agreement --Congruency --Accuracy	Subject response obtained to measure: --Satisfaction --Commitment --Perceived Correctness --Other Data
Materials:	Packet A	Packet B	Packet C	Packet D
Time Required (Approximate)	30 Minutes	60 Minutes	20 Minutes	10 Minutes

subjects with Packet A. The second step is the control or experimental treatment provided through instructions in Packet B. The third step involves the collection of data for the measurement of the communication effects in terms of the coorientation model through the test instruments in Packet C. The final step measures the subordinate attitudes toward the budget decided upon in the session. Instruments in Packet D obtain these measures as well as some other data to aid in analyzing the results of the experiment. Each of these steps and the associated materials are discussed below. The full range of experimental materials are provided in the appendix.

### Setting

The laboratory setting is designed to typify an organizational environment in which the participative budgeting model may operate. At the same time it incorporates the design considerations discussed above. The setting consists of the budgeting situation, individual participants, the organizational relationships, and the experimental task. Each of these is discussed below.

### The Budgeting Situation

The budgeting situation is the experimental baseline, or common starting point for all subjects. This situation is contained in Packet A, displayed in pages 181 - 192 of the appendix. Packet A, developed from the IBM game, describes the operating environment of an organization, details a five year financial history for this organization, and outlines periodic resource allocation and pricing decisions required. The pricing decisions are included to add realism



to the game setting, although the focus is on the resource allocation decisions required.

### Subjects

A total of thirty-two graduate and senior level undergraduate students in business administration were volunteer participants in the experiment. Subjects received \$5.00 as compensation for the two hour session. These thirty-two subjects were randomly paired to form sixteen groups for the sessions. A third member of each group was an accomplice. These individuals were assigned to one of three organization positions described in Packet A; the president, the vice president for production, and the vice president for sales. The accomplice was always assigned the president position, and the two subjects were assigned the vice president positions. However, the subjects were not informed the president role was that of an accomplice.

### The Accomplice

The accomplice controlled the experimental sessions. An undergraduate student served as the accomplice to minimize the possibility of subjects perceiving the accomplice as having higher status apart from the president position. This person was given extensive briefings to become thoroughly familiar with the budgeting situation and the necessary procedures in each step of the experiment.

The same person controlled all of the subject groups to preclude the possibility of a confounding effect on the results from the use of several accomplices. Thus, the experiment involved sixteen separate laboratory sessions based on a common budgeting situation with the

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PARTICIPATIVE BUDGETING AS A COMMUNICATION PROCESS: A MODEL AND--ETC(U)

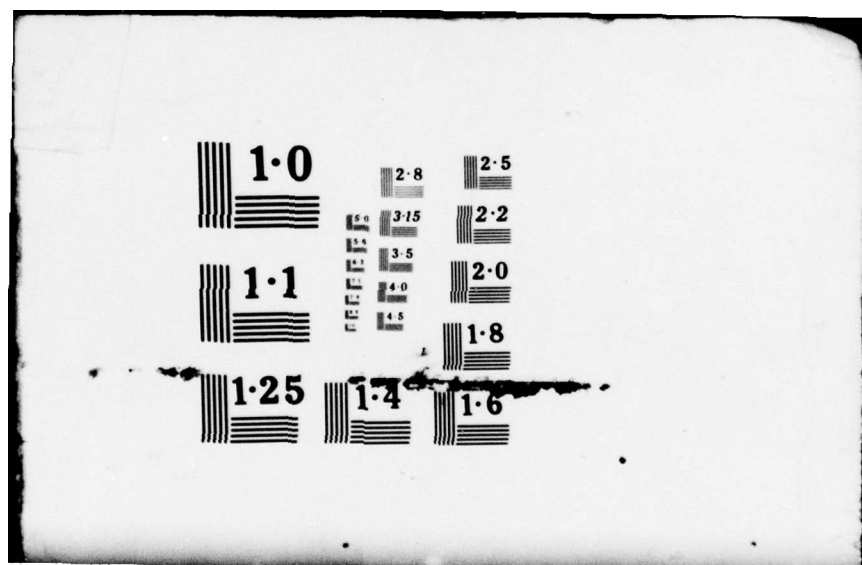
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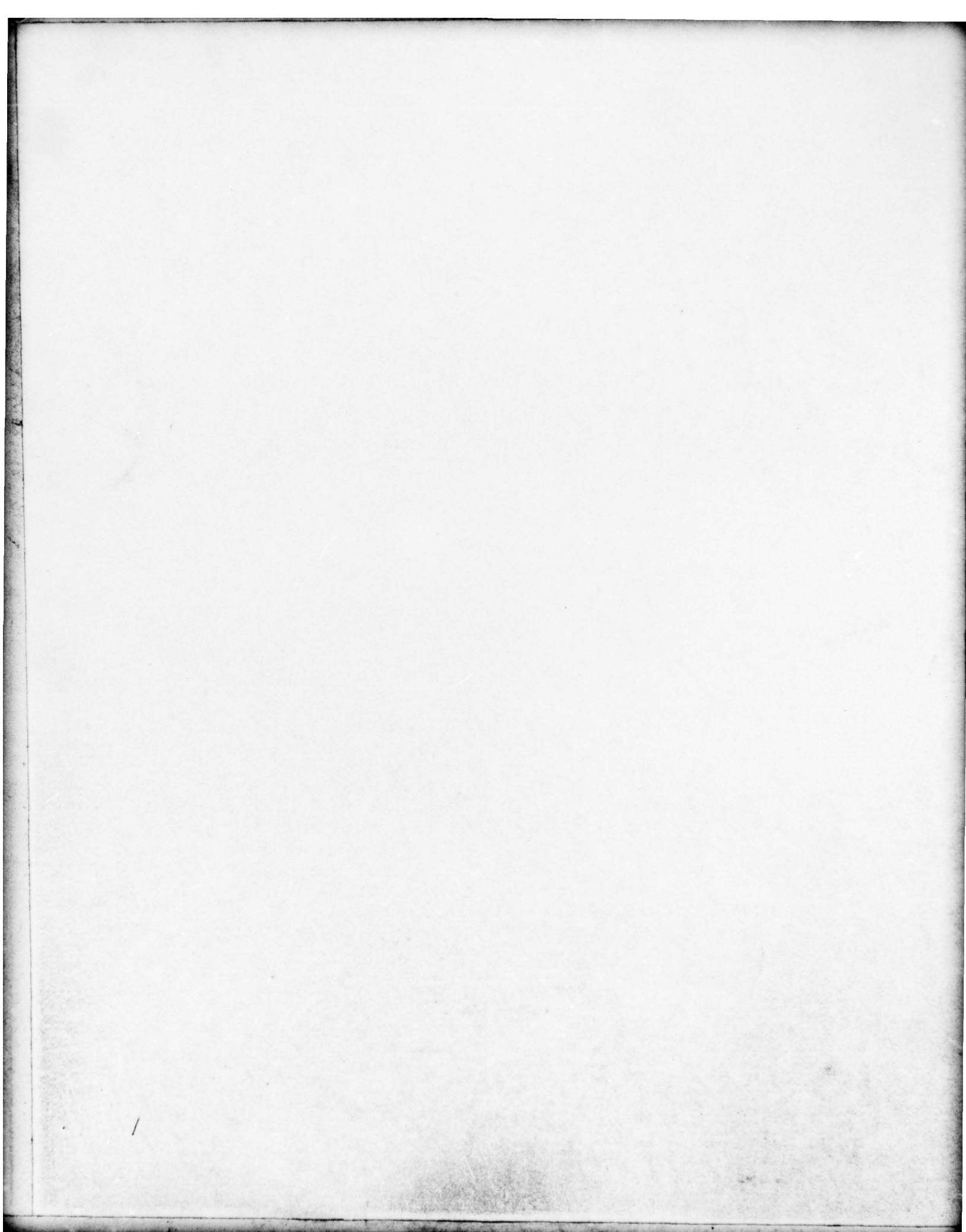
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same accomplice.

### The Organizational Relationships

The three organization positions filled by the accomplice and the subjects were delineated in Packet A. This three person organization allows an expanded use of the coorientation measurement model. The two person exemplar in the coorientation model discussed as part of the participative budgeting model development displayed variables based on two sets of relationships, those being the perceptions of each individual relative to the other concerning the budgeting situation.

A three person coorientation situation involves a greatly expanded range of perception relationships. In terms of the organizational positions described, six sets of relationships are possible concerning the budgeting situation:

SET	THE PERCEPTIONS OF	RELATIVE TO	THE PERCEPTIONS OF
One:	The President	-	The Vice President for Production
Two:	The President	-	The Vice President for Sales
Three:	The Vice President for Production	-	The President
Four:	The Vice President for Production	-	The Vice President for Sales
Five:	The Vice President for Sales	-	The President
Six:	The Vice President for Sales	-	The Vice President for Production



Since the president position is taken by the accomplice, the first two sets of relationships are not considered. The third and fifth sets allow the observation of the subjects' perceptions relative to the accomplice in the budgeting situation. Similarly, the fourth and sixth sets allow the observation of each subject's perceptions relative to the other subject concerning the budgeting situation. Thus, the experiment allows the observation of both subordinate-management relationships and subordinate-subordinate relationships. The specific relationships observed are discussed in connection with the measurements obtained with Packet C later in the chapter.

#### The Task

Each subject was required to conduct an analysis of the budgeting situation contained in Packet A. Based on the analysis, the subject was then required to recommend a resource allocation plan and pricing strategy for the organization to improve both profits and market share in the coming period. However, before the subject developed the recommendation, the experimental treatment was administered, depending on the condition to which the subject was assigned.

#### Conditions

Packet B provided specific instructions to the subject concerning the task, the responsibilities of his role, and the budgeting procedures used in the firm. These instructions established which one of the four conditions of the experiment the subject had been assigned. The control condition allowed no interactive communication while the three treatment conditions varied the type and extent of

communication as specified by the corresponding phases of the participative budgeting model. The procedures within each condition are outlined below and provided in detail in the appendix.

The conditions also involved two types of communication networks. The no interactive communication condition involved a wheel type network with one-way communication channels from the accomplice to each subject. The three interactive communication conditions employed an all channel network with two-way communication channels linking the accomplice and each of the subordinates.

#### Condition 1 - The Control Group

Condition 1 is the control group. Thus no interactive communication was allowed between the subjects or with the accomplice. The subjects randomly assigned to this condition reported individually to the session. The subject was informed that other subjects were also taking part in the same session in other rooms, and the necessity for the physical separation would be explained in a few minutes. The subject was then given a copy of Packet A.

After reading Packet A, the subject was provided Packet B structured for the control condition. This packet assigned the subject to his or her specific position as one of the vice presidents in a physically dispersed organization. Hence, the members were in different locations (rooms). Specific instructions were then given to carry out the responsibilities of the position. For example, Packet B as received by a subject assigned the sales vice president position was as follows.

## SPECIAL CHARACTERISTICS OF YOUR FIRM

You are now the newly employed Vice President for Sales. Recall that the organization chart of your firm, provided earlier, defines your position as reporting directly to the president.

The company's production facilities are located in area 2, your home area. The company headquarters and main sales offices are located in area 4 of the geographical market, but in different cities. Thus the vice president for sales and the president of the company are in different cities, and the vice president for production is in a different area. Because of the physical separation of the personnel in your firm, the following procedures have been established for making the area and plant decisions.

First, the president and each vice president receive copies of the reports available. (Your copy of the reports is provided in Packet A.) All personnel receive the same information in these reports. Each person conducts a thorough analysis of the information in these reports individually, as each person is in a different location.

After completing the analysis, each vice president makes recommendations to the president concerning the area decisions and the plant decisions required for the coming year. These recommendations are forwarded to the president by the use of a standard budget form. (The form is located at the end of the packet.) This standard form has proven very useful in the past as an accurate means to forward recommendations to the president. The possibility of errors is greatly reduced since the same format is utilized by all personnel.

## YOUR ROLE

As the Vice President for Sales, your primary responsibility is to maximize the sales revenue and the overall market share of the company in the industry. The company president has established the overall goal of the firm as the maximizing of profits and is very concerned with the performance of the Sales Division. For example, over the last five years the market share of the company has not increased much, if at all. Sales revenue has been highly variable. These problems are reflected in the declining profit picture over the last three years.

Given this situation, your analysis should be directed toward determining the cash needed for your marketing efforts and the pricing strategy required to increase sales revenues and market share position in the industry. At the same time you should ensure that your marketing and sales plans are consistent with the capabilities of the Production Division. Production is expected to minimize the

unit cost of producing the product. Since the Vice President for Production is in another location, it is not possible to communicate directly. However, recall that both of you have exactly the same information in your reports.

To meet your responsibilities, you should now take the following steps in the order given.

First, determine the cash required to significantly increase sales revenues and market share. At the same time, be sure to consider the implications of your sales plans for the production effort. While making these determinations, you may refer back to the reports provided in Packet A as often and as much as you wish. You may take up to forty-five minutes to make these determinations.

Secondly, after you decide how much cash you need, take out the budget form located at the back of this packet. The form is in duplicate and contains a glossary of brief descriptions of the effects of each decision that you should expect. Completely fill out the budget form. That is, you should indicate what you think (1) the unit price charged in each area should be, and (2) the appropriate amount of cash for marketing in each area and each plant decision should be. The last balance sheet available (year 5) indicates that your firm has \$10,957 for operations in the coming year. Your cash allocations to the various functions requiring cash must not exceed this amount. Also, note the budget form does have a comments section. You may utilize this section to provide any additional recommendations you feel the president should receive.

Thirdly, after you have completely filled out the budget form, submit the form to the president. (This is accomplished by giving the form to the session administrator, who will take the form to the president.) Retain the duplicate of the budget form as you will need the form for later use. Also, hand in Packet A at this time to the session administrator. After turning in the budget form (original) and Packet A you will receive Packet C as a replacement for Packet A. Upon receipt of Packet C, please open the packet and follow the instructions given inside the packet.



## FIRM 2

## BUDGET RECOMMENDATIONS

## AREA DECISIONS

## UNIT PRICE

AREA 1 \$\_\_\_\_\_ (Prices should be in dollars only)

AREA 2 \$\_\_\_\_\_

AREA 3 \$\_\_\_\_\_

AREA 4 \$\_\_\_\_\_

## MARKETING EXPENDITURES

AREA 1 \$\_\_\_\_\_

AREA 2 \$\_\_\_\_\_

AREA 3 \$\_\_\_\_\_

AREA 4 \$\_\_\_\_\_

A. TOTAL MARKETING \$\_\_\_\_\_ (Areas 1 - 4)

B. PLANT IMPROVEMENT \$\_\_\_\_\_

C. PRODUCTION \$\_\_\_\_\_

D. RESEARCH \$\_\_\_\_\_

TOTAL EXPENDITURES \$\_\_\_\_\_

TOTAL EXPENDITURES CANNOT EXCEED \$10,957

## COMMENTS AND ADDITIONAL RECOMMENDATIONS

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 (Signature)



Thus, in the control condition, the subject never saw or communicated with the other subject. The subject initially may have thought that written communication with the president (the accomplice) occurred when the budget recommendation was submitted. However, the subject was informed in step four of the session that the president had made the final resource allocation decision without considering the subjects' recommendations.

#### Condition 2 - Orientation

The second condition allowed actual interactive communication among the subjects and the accomplice. This communication was limited to discussion of the facts of the budgeting situation, thus corresponding to the orientation phase of the participative budgeting model.

Each subject reported individually to the session and was joined by the other subject and the accomplice. The experimenter introduced the three individuals to each other and asked them to sit wherever they wished around a square conference table. Then each individual was given copies of Packets A and B. Thus the subjects had no reason to suspect the third person was an accomplice. The group was informed that after reading Packet A each person should proceed to Packet B containing the specific role assignment and responsibilities, and further, the person who happened to receive the president assignment would conduct the remainder of the session according to the instructions in the packet as the experimenter would not be present during the session. The group was informed the purpose of this procedure was to avoid the possibility that anyone might feel uncomfortable

in carrying out their responsibilities in front of the experimenter.

After reading Packet A, subjects and the accomplice proceeded to Packet B as in the control condition. However, in this condition the description of the firm eliminated the physical dispersion of facilities, and added the following to the budgeting procedures:

Secondly, a meeting of all personnel is held. This meeting has proven very useful in the past as a means to ensure that everyone knows what the facts are in the situation facing the firm.

The subjects' position responsibilities included the following additional one:

Secondly, the president will convene a meeting with the vice presidents after the analysis is completed. The purpose of the meeting each period is to ensure that everyone knows what the facts of the situation facing the firm are. Thus, you provide the president and the other vice president with the facts that you have determined from your analysis of the reports. In turn, you are likely to receive some new facts from the other persons at the meeting. This meeting will take about thirty minutes.

The procedures for the subjects after the meeting were basically the same as those in condition 2.

The Packet B given to the accomplice contained the agenda for the session. In this condition, the agenda was limited to the accomplice asking the subjects what they thought the facts were. The accomplice specifically asked the questions described later in Packet C but not in the same order or in the same format. The accomplice was also free to answer any questions related to the facts posed by either subject. However, as much as possible, any answer came only after "paging through Packet A," or asking the other subject if he or she knew the answer.

After the meeting, the three group members remained in the room

and the subjects followed the instructions in Packet B to conduct any remaining analysis necessary and then submit their budget recommendations. The accomplice, following the instruction in Packet B, appeared to be conducting an analysis while awaiting the recommendations. Then, upon turning in the budget recommendations to the accomplice, subjects received Packet C.

### Condition 3 - Evaluation

This condition expanded the interactive communication allowed to correspond to the evaluation phase of the participative budgeting model. Thus, this communication included discussion of the facts of the budgeting situation and individual ideas, suggestions, and opinions regarding alternative resource allocations.

As in condition 2, each subject was joined at the beginning of the session by the other subject and the accomplice. Packets A and B were provided as in condition 2 as well.

Packet B differed from the one in condition 2 in describing the firm's budgeting procedures as follows:

Secondly, a meeting of all personnel is held. This meeting has proven very useful in the past as a means to accomplish the following: ensuring that everyone knows what the facts are in the situation facing the firm; and allowing the exchange of ideas, suggestions, and alternatives among individuals concerning the decisions to be made.

The subjects' position responsibilities included the following modification to the meeting procedures:

Secondly, the president will convene a meeting with the vice-presidents after the analysis is completed. The purpose of the meeting each period is to ensure that everyone knows what the facts of the situation facing the firm are, and to allow the exchange of ideas, alternatives, and suggestions among the individuals in the company. Thus, you should provide the

president and the other vice-president with any facts you have determined from your analysis of the reports. In turn, you are likely to receive some new facts from these persons. Similarly, you should exchange ideas, suggestions, and alternatives that the firm might consider as actions for the coming year. This meeting will take about forty minutes.

The procedures for the subjects after the meeting were the same as those in condition 2.

The accomplice conducted the discussion of the facts in the same manner as in condition 2. In addition, the accomplice ensured that each subject specifically indicated what his or her thoughts were on how the resources should be allocated and what prices should be charged. The accomplice also indicated her own thoughts concerning these actions. After the meeting, the same procedures as in condition 2 were carried out.

#### Condition 4 - Joint Decision Making

This condition corresponded to the joint decision making phase of the participative budgeting model. Interactive communication allowed in condition 3 was permitted to the same extent in this condition. Then the decision on the final resource allocation plan was jointly reached by the accomplice and the subjects.

The same procedures as in conditions 2 and 3 were used to start the session. However, the Packet B description of the firm modified the budgeting procedures as follows:

At the conclusion of the meeting, the budget form is jointly filled out by the president and the vice presidents.

The subjects' position responsibilities included the following additional one at the end of the meeting:



Thirdly, at the end of the meeting, you will jointly decide each area decision and plant decision for year 6. To accomplish this, take out the budget form located at the back of this packet. Attached to the form is a glossary of brief descriptions of the effects of each decision. Completely fill out the budget form. That is, you should record on the form what you jointly decide with the other members of the firm as to (1) the area prices and (2) the marketing expenditures in each area and the plant decisions required. The cash allocations to the various functions may add up to but not exceed the \$10,957 available cash balance as of the end of year 5.

The accomplice role in this condition did not include the final decision authority. However, the accomplice had to make sure that a joint decision was reached within the time allowed. After the meeting, each group member was provided Packet C.

#### Measurements

The procedures in Packets A and B took approximately ninety minutes of the session in each condition. The remaining thirty minutes were used to obtain measures for the subordinate content analysis and attitudes toward the budget. During these procedures no verbal communication was allowed, thus minimizing the effects of history.

#### Subordinate Analysis of the Content

Packet C, displayed in pages 203 - 212 of the appendix was designed to obtain data for the variables representing subordinate content analysis hypothesized to change as a result of the allowed interactive communication. These variables are the coorientation model relationships of understanding, accuracy, congruency, and agreement. Each subject's responses relating to the perceptions of the attributes and evaluations of the budgeting situation needed for



these variables were recorded immediately after the experimental treatment (or lack of it) through the questions in Packet C.

### Procedures

The procedures varied slightly across conditions to obtain the measurements. In condition 1 the experimenter returned to the room at the appropriate time to collect the subject's budget recommendation and provided the subject a copy of Packet C. In conditions 2 and 3, the instructions to the accomplice directed her to collect the subjects' budget recommendations and distribute copies of Packet C to the subjects and herself, thus maintaining the accomplice ruse. In condition 4, since each person had a copy of the jointly decided budget, the accomplice instructions directed only the distribution of packets.

The copies of Packet C distributed were coded so that the accomplice made sure she received a dummy copy in the distribution. Her packet in conditions 2 and 3 contained budget decision forms and blank paper rather than the questions asked of the subjects. Thus while the subjects were working through the questions, the accomplice made the budget decision and filled out the forms for distribution to the subjects as part of Packet D in the final step of the experiment. The accomplice was free to make any decision she felt appropriate in each of the sessions corresponding to the first three conditions. Then during the rest of the time allotted for Packet C, the accomplice wrote out brief comments concerning the session for possible anecdotal evidence in analyzing the results. In condition 4,

since the budget already had been jointly determined, the accomplice recorded her actual evaluation concerning the budget for that session and any comments concerning the session events. Thus the accomplice was always as busy as the subjects.

### Variables

As noted above, the three person coorientation setting allows an expanded set of perception relationships to construct variables that may be affected by communication. The present analysis uses the subject's perceptions of the attributes or facts of the budgeting situation relative to those of the accomplice to construct a measure of understanding. The actual evaluations of how resources should be allocated and the estimates of the accomplice's evaluation as are used to construct one set of accuracy and congruency relationships and an agreement relationship. The actual evaluations and the estimates of the other subject's evaluations held by each subject are matched as appropriate with those of the other subject to construct a second set of accuracy and congruency relationships. The specific relationships and the data sources used to measure these relationships are described below.

Understanding. Questions 1 through 14 in Packet C are based on selected facts of the budgeting situation. In general, these questions deal with the position of the firm in the industry, the past pricing strategy, trends established over the five year history, and the economic relationships suggested by the financial data provided.

Subjects in all four conditions responded to these fourteen questions. A measure of understanding was developed by matching each subject's responses with those of the accomplice that had been recorded prior to the experiment. Since the accomplice knew the correct responses, this matching resulted in finding how many of the subject responses were correct. Thus, this measure not only indicated the degree to which the subject was cooriented to the budgeting situation with the accomplice but also showed the extent to which the subject correctly perceived the situation in terms of these questions.

Evaluation based variables. The instruction in Packet B had required each subject in conditions 1 through 3 to submit a budget recommendation. This written recommendation served as a measure of each subject's own evaluation. To capture the estimates of the other evaluations by each subject, subjects in these conditions were asked to respond to the following questions in Packet C.

15. The other vice president in your firm also submitted a budget recommendation to the president. In the space provided below, estimate what you think the other vice president recommended to the president

(Copy of Budget Form)

16. In a few moments, you will receive the final decision the president made on the budget. In the space below, indicate what you think the president will finally decide

(Copy of Budget Form)

The resource allocation plan or budget imposed by the accomplice provided the president's evaluation in these conditions.

Since subjects and the accomplice jointly decided the resource allocation plan adopted in condition 4, the necessary data were

captured somewhat differently. Each subject's own evaluation and estimates of the other evaluations were captured by subject responses to the following questions:

15. Recall that the decisions were jointly made by the members of your firm. In the space provided below, indicate what you personally think the decisions should be

(Copy of Budget Form)

16. Same format as 15, but relative to the other vice president.
17. Same format as 16, but relative to the president.

As mentioned, the actual evaluation of the accomplice was captured while the subjects were working through Packet C, thus providing the president's evaluation.

The observations in each condition were appropriately matched in terms of the coorientation measurement model to construct two sets of accuracy and congruency relationships and an agreement relationship. Figure 4-2 summarizes the specific relationships and data sources for each condition. The subordinate-superior relationship of congruency matches the subject's actual evaluation with the estimate of the accomplice evaluation; accuracy matches the subject's estimate of the accomplice evaluation with the accomplice's actual evaluation; and agreement matches the subject's actual evaluation with the final budget. The subordinate-subordinate relationships are constructed similarly for congruency and accuracy.

The jointly decided budget was utilized instead of the accomplice's actual evaluation in condition 4 for agreement because the accomplice could not impose the budget plan in this condition. In a real world setting, the jointly decided plan becomes management's



Fig. 4-2. Summary of Evaluation-Based Relationship Measurements

FOR EACH SUBJECT	MEASURED BY MATCHING OF:	
	In Conditions 1-3	In Condition 4
Subordinate-Manager Relationships: Congruency Accuracy Agreement	Submitted Budget : Response To Recommendation : Question 16	Response To : Question 15 : Response To : Question 17
	Response To : Question 16 : Imposed Budget	Response To : Question 17 : Accomplish Actual Evaluation
	Submitted Budget Recommendation : Imposed Budget	Response To : Question 15 : Jointly Decided Budget
Subordinate-Subordinate Relationships: Congruency Accuracy	Submitted Budget : Response To Recommendation : Question 15	Response To : Question 15 : Response To : Question 16
	Response To : Question 15 : Other Subject's Budget Recommendation	Other Subject's Response To : Question 16 : Response To : Question 15



plan. However, as it turned out, in all but one of the condition 4 sessions, the jointly decided plan was essentially the same as the accomplice's actual evaluation.

#### Subordinate Attitudes Toward the Budget

After completing Packet C, subjects received Packet D. Subordinate satisfaction with the final budget, commitment in terms of willingness to change the budget and perceived correctness of the budget were measured by responses to Likert-scaled questions in Packet D. The packet, displayed in the appendix and outlined below, varies slightly between the control and the experimental conditions.

In the control condition only, the individual subject received the written budget decision from the accomplice prefaced by the following statement:

The decisions made by the president for year 6 are attached to this sheet. The president of your firm made these plant and area decisions independently - that is, the recommendations of the vice presidents for sales and production were not considered in making these decisions.

Thus, this statement notified the subject that no communication occurred with the accomplice. Subjects in the experimental conditions received statements appropriate to their conditions, and all subjects responded to the following questions:

1. If given the opportunity, to what degree would you now change the cash allocations made and the prices set to meet your responsibilities in this firm?
  - A. Not at all.
  - B. Very little.
  - C. To some degree.
  - D. To a considerable degree.
  - E. To a very great degree.

2. How satisfied are you with the cash allocations made and the prices set?
  - A. Very dissatisfied.
  - B. Pretty dissatisfied.
  - C. Neither satisfied nor dissatisfied.
  - D. Pretty satisfied.
  - E. Very satisfied.
  
3. How much do the decisions on cash allocations and prices as finally made represent the ones that you now believe to be correct?
  - A. Basically what I consider correct.
  - B. Fairly close to what I consider correct.
  - C. Somewhat close to what I consider correct.
  - D. Fairly different from what I consider correct.
  - E. Very different from what I consider correct.

#### Other Data

Several other questions were asked of subjects at the end of the session as aids to interpret the results of the experiment. One question was designed to determine the effectiveness of the experimental treatment. Subjects in conditions 2 and 3 were asked:

How much weight or influence do you feel your budget recommendations had on the president's final budget decision? (Please circle the appropriate number).

1	2	3	4	5
None	A Little	A Fair Amount	A Consi- derable Amount	A Great Deal

Subjects in condition 4 were asked:

How much say or influence did you have on the final decisions made?

- A. None.
- B. Some, but not as much as the other persons.
- C. About the same as the other persons.
- D. Somewhat more than the other persons.
- E. A lot more than the other persons.

All subjects were also asked to provide cumulative grade point and major field data.

The session then concluded with a debriefing. Subjects were not informed, however, that the president was an accomplice. The purpose of the experiment was explained and subjects were informed that they might be requested to participate in another session (however none were). Each subject was then compensated \$5.00 and the session was over.

#### Summary

This chapter describes the design and methodology of the experiment used as a basis to test the hypotheses developed in the previous chapter. The procedures developed in terms of the post test only, control group approach allow the results of the analyses of observations in the next chapter to be unambiguously linked to the experimental treatment of interactive communication.

The sixteen laboratory sessions conducted in the experiment each involved two subjects to allow thirty-two observations on the variables of interest. In the three person budgeting situation of the experiment, the specific variables measured are:

#### Subordinate Analysis of the Content;

- Understanding
- Accuracy in perceiving the other  
vice president
- Accuracy in perceiving the president
- Congruency with the other vice  
president
- Congruency with the president
- Agreement with the final budget

Subordinate Attitudes Toward the Budget;

Satisfaction

Perceived Correctness

Commitment

Each of these variables is considered a response variable to the experimental treatment of participation as allowed interactive communication.

In the next chapter, analysis of variance statistical procedures are described and utilized to determine whether significant increases occurred in each of these response variables as a result of the variation in the experimental treatment. Then correlation analysis is described and used to determine linear relationships between these response variables. The results of these statistical analyses are used to test the study hypotheses that more favorable subordinate attitudes result from participative budgeting and that the coorientation model describes the mechanism enabling these more favorable attitudes to result from the process.

## CHAPTER FIVE

### ANALYSIS OF RESULTS

The purpose of this chapter is to discuss the analysis of the results obtained from the laboratory sessions of the study. The first section of the chapter discusses analysis of variance techniques and their use in assessing the hypothesized effects of the participative budgeting process on subordinate analysis of the process content and attitudes toward the final budget. The second section discusses correlation analysis and its applicability to assess the hypothesized relationships between subordinate content analysis variables and the attitudes toward the budget. The third section discusses findings related to the other data collected in the experiment.

#### The Effects of Participation as Interactive Communication

The allowed variation in the nature and extent of the interactive communication over the three phases of the participative budgeting model was hypothesized to lead to significantly increased levels or states of the coorientation variables representing the subordinate content analysis and significantly more favorable attitudes toward the final budget. Bales and Strodtbeck point out that the phases of their group problem solving model, which underly the model of the study, consist of qualitative changes in the nature and



extent of interactions.<sup>1</sup> Thus the use of the single factor, fixed effects analysis of variance model is considered appropriate to analyze the data obtained in the experiment. Neter and Wasserman note that this general model can be used to assess the effects of either quantitative or qualitative independent variables.<sup>2</sup> This model is discussed below.

### Statistical Methodology

The single factor fixed effects analysis of variance (ANOVA) model is a statistical model generally used to test the statistical relation between an independent variable, or factor, and a dependent variable. The factor may be either quantitative or qualitative, and take on several particular forms or levels.<sup>3</sup> In the present analysis the variation in the allowed interactive communication as the experimental treatment in the laboratory sessions is considered a qualitative participation factor with four levels corresponding to the four conditions in the experimental design.

To facilitate the use of the ANOVA model in the analysis below, the factor levels, subjects, and observations are denoted by indices as follows. The participation factor is indexed by  $j = 1, \dots, 4$  corresponding to the four experimental conditions. The eight subjects assigned to groups within each condition are indexed by  $i = 1, \dots, 8$ . Taken together, the indices represent a particular observation on the

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<sup>1</sup>Bales and Strodtbeck, "Phases in Group Problem Solving," p. 485.

<sup>2</sup>John Neter and William Wasserman, Applied Linear Statistical Models (Homewood, IL: Richard D. Irwin, Inc., 1974), p. 420.

<sup>3</sup>Ibid.

$i$ th subject at the  $j$ th factor level, denoted by  $Y_{ij}$ . The total number of observations is denoted by  $N_T = \sum_{j=1}^4 n_j$  or the number of subjects at each level summed across levels. In this analysis,  $N_T = 32$ .

The ANOVA model can now be stated in terms of the present analysis as:

$$Y_{ij} = u. + t_j + e_{ij}$$

Where

$Y_{ij}$  is the observed value of a response variable in the  $i$ th trial for the  $j$ th level of participation. The response variable, in turn, is each of the subordinate content analysis variables and the attitudes toward the budget.

$u.$  is a constant component common to all observations and includes the effect of the information in Packet A provided to all participants concerning the budgeting situation.

$t_j$  is the effect of the  $j$ th level of participation.

$e_{ij}$  are independent error terms assumed to have a normal distribution with a mean of zero and a constant variance across levels, denoted  $N(0, \sigma^2)$ .

$i = 1. . . . 8$  subjects at each level or condition.

$j = 1$  is the no participation condition;

$j = 2$  is the orientation condition;

$j = 3$  is the evaluation condition;

$j = 4$  is the joint decision making condition.

This model is used below to analyze the measures obtained for each of the subordinate content analysis and attitude variables toward the budget.<sup>4</sup> Each of these variables is considered a response variable ( $Y_{ij}$ ), in turn, and labelled as follows:

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<sup>4</sup>The data sources for each response variable is identified in the previous chapter. See pages 100 - 105.

<u>Response</u>	<u>Variable</u>
1	Understanding.
2	Accuracy in perceiving the other vice president.
3	Accuracy in perceiving the president.
4	Congruency with the other vice president.
5	Congruency with the president.
6	Agreement with the final budget.
7	Satisfaction with the final budget.
8	Perceived correctness of the final budget.
9	Commitment to the final budget.

### The F Test

One key aspect of analysis using an ANOVA model involves the use of the F ratio. This ratio compares the variance between groups to the variance within groups.<sup>5</sup> This ratio result is interpreted in a sampling distribution of F under the null hypothesis, or no significant differences between groups. If the probability value of the observed ratio is less than or equal to the criterion set for statistical significance, the null hypothesis of no effects of the independent variable is rejected.

In this study the criterion, or significance level  $\alpha$ , for the individual response variables has been set at a probability level of .05. Given the four levels of the study, and the thirty-two subjects an F ratio greater than 2.95, determined from the table of the F distribution becomes the critical value.<sup>6</sup> An observed F ratio for any response variable of greater than 2.95 allows rejection of the

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<sup>5</sup>The mathematical development of the F test is demonstrated in Neter and Wasserman, Applied Linear Statistical Models, pp. 433-443.

<sup>6</sup>Ibid., p. 811.

null hypothesis of no significant differences among the four levels.

Thus, the specific decision rule to decide between:

$C_1: t_1 = t_2 = t_3 = t_4 = 0$ , and

$C_2: \text{not all } t_j = 0$ ,

where  $t_j$  is the effect of participation is:

If  $F^* = \frac{\text{variance between groups}}{\text{variance within groups}} \leq 2.95$ , conclude  $C_1$ ;

otherwise conclude  $C_2$ .

Thus, for each response variable,  $C_1$  is the null hypothesis that no significant differences exist across levels.  $C_2$  is the alternative hypothesis that participation does have an effect.

#### Estimation of Factor Effects

The F test is an initial step to determine whether detailed analysis of the factor level effects is warranted. If the F test allows the rejection of the null hypothesis for a given response variable, then several effects of the participation factor are of interest to assess the hypothesized results from the participative budgeting model. Six statements involving pairwise comparisons of factor effects ( $t_j$ ) are of interest:

1. Whether the effect of allowing interactive communication in the orientation phase differs from the effect of allowing no interactive communication at all. This compares condition  $j = 2$  with condition  $j = 1$
2. Whether the effect of allowing interactive communication in the evaluation phase differs from the effect of no interactive communication. This compares condition  $j = 3$  with condition  $j = 1$
3. Whether the effect of the joint decision making phase differs from the effect of no interactive communication. This compares condition  $j = 4$  with condition  $j = 1$



4. Whether the effect of the evaluation phase, which includes discussion of both attributes and evaluations, differs from the effect of the orientation phase, which allows discussion of attributes only. This compares condition  $j = 3$  with condition  $j = 2$
5. Whether the effect of the joint decision making phase differs from the effect of the orientation phase. This compares condition  $j = 4$  with condition  $j = 2$
6. Whether the effect of the joint decision making phase differs from the effect of the evaluation phase. This analysis assesses whether the reaching of a group consensus in addition to the discussion of the attributes and evaluations has a different effect than discussion only, by comparing condition  $j = 4$  with condition  $j = 3$ .

These comparisons allow the determination of whether participation has any effects and, if so, in what budgeting process phase or phases the effects occur.

Several techniques are available to conduct this analysis of factor effects. The appropriate method for the present study is the Tukey method of multiple comparisons. This method applies when: all factor level sample sizes are equal, in this case  $N_j = 8$  for  $j = 1, \dots, 4$ ; and the comparisons of interest involve the set of all pairwise comparisons of factor level means, in the present study, the six statements above.<sup>7</sup>

The Tukey method allows the construction of a confidence interval for each pairwise comparison such that all confidence intervals hold simultaneously. For a confidence coefficient of  $(1 - \alpha)$  all pairwise comparisons in the family or set will be correct in  $(1 - \alpha)$  100% of the families when repeated sets of samples are selected and all pairwise confidence intervals are calculated each time.<sup>8</sup> For

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<sup>7</sup>Ibid., p. 473.    <sup>8</sup>Ibid., p. 474.



the present analysis, a confidence coefficient has been set at  $(1 - \alpha) = .90$ . Then the family of six comparisons can be said to hold simultaneously such that 90% of the comparisons so constructed will contain the true comparisons in repeated samplings.

The procedures involved in the Tukey method utilize the studentized range distribution. This distribution relates to the number of factor levels and the sample size in the ANOVA model.<sup>9</sup> The studentized range distribution has been tabulated, and given the four factor levels, thirty-two subjects and the family confidence coefficient of .90, the appropriate value for the simultaneous confidence interval construction is 3.40.<sup>10</sup>

The confidence intervals for the six statements are constructed as follows. Let  $\bar{Y}_{.j}$  be the sample mean for the  $j$ th factor level, and  $D = \bar{Y}_{.j} - \bar{Y}_{.j'}$  be the difference or comparison of any two factor level sample means. Then  $S^2(D) = S^2(\bar{Y}_{.j}) + S^2(\bar{Y}_{.j'})$  is the sample variance associated with  $D$ .<sup>11</sup> The multiple comparison confidence intervals for all pairwise comparisons  $u_j - u_{j'}$  with a family confidence coefficient of .90 are:

$$D - T \cdot S(D) \leq u_j - u_{j'} \leq D + T \cdot (SD)$$

Where:

$u_j - u_{j'}$  is the difference between any two true factor level means, with  $u_j = \mu + t_j$  from the ANOVA model.

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<sup>9</sup>Ibid.    <sup>10</sup>Ibid., Table A-9.

<sup>11</sup>These procedures are more fully developed in Neter and Wasserman, pp. 473-477.

$D = \bar{Y}_{.j} - \bar{Y}_{.j}$  is the unbiased estimate of the difference  $u_j - u_j$ .

$$S(D) = \sqrt{S^2(D)}$$

$T = \frac{1}{\sqrt{2}} (3.40)$  where 3.40 is the appropriate value noted above from the studentized range distribution. The T value is 2.40.

The specific format of this family of contrasts is displayed in figure 5-1. As the factor effects are assessed repetitively later, each set is displayed in final form in the format of figure 5-1.

#### Model Assumptions

Several assumptions underlying the ANOVA model must be satisfied to consider the model as the appropriate one for the analysis. They are:

1. Each of the probability distributions at each factor level is normal and has the same variance
2. The observations for each factor level are random observations from the corresponding probability distributions and are statistically independent of the observations for any other factor level<sup>12</sup>

The validity of the first assumption is assessed to determine the appropriateness of the ANOVA model. For each of the response variables, the test of the equal variance assumption is made initially in the analysis below. If the variance is not constant, transformations to establish constancy are often effective in establishing the normality of the error term distribution. The test used for assessing the equality or constancy of variance across levels is the Hartley test.<sup>13</sup> This test is based on the ratio of the largest sample variance obtained over the four conditions, denoted  $\max(S_j^2)$  and the

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<sup>12</sup>Ibid., p. 426.    <sup>13</sup>Ibid., pp. 512-513.

Fig. 5-1

GENERAL FORM OF THE FAMILY OF CONFIDENCE INTERVALS  
FOR DIFFERENCES IN FACTOR LEVEL MEANS  
RESULTING FROM PARTICIPATION:  
90% FAMILY CONFIDENCE COEFFICIENT

Orientation to No Participation	$D - 2.40S(D) \leq U_2 - U_1 \leq D + 2.40S(D)$
Evaluation to No Participation	$D - 2.40S(D) \leq U_3 - U_1 \leq D + 2.40S(D)$
Joint Decision Making to No Participation	$D - 2.40S(D) \leq U_4 - U_1 \leq D + 2.40S(D)$
Evaluation to Orientation	$D - 2.40S(D) \leq U_3 - U_2 \leq D + 2.40S(D)$
Joint Decision Making to Orientation	$D - 2.40S(D) \leq U_4 - U_2 \leq D + 2.40S(D)$
Joint Decision Making to Evaluation	$D - 2.40S(D) \leq U_4 - U_3 \leq D + 2.40S(D)$

smallest, denoted  $\min(S_j^2)$ , where  $j$  is the particular factor level.

This ratio is the test statistic:

$$H^* = \frac{\max(S_j^2)}{\min(S_j^2)}$$

The test statistic is compared to the distribution of  $H$  which has been tabulated when  $C_1$  holds. The  $F$  test is not much affected by unequal variances if the factor level sample sizes are equal, as long as the differences are not unusually large. Hence, a fairly low level of significance may be justified.<sup>14</sup> Since the present study meets this condition of equal sample sizes, an  $\alpha = .01$  is considered appropriate. Given the four factor levels, a sample size of eight within each level and  $\alpha = .01$ , the critical value of  $H$  becomes 14.5.<sup>15</sup>

The specific decision rule to decide between

$C_1: \sigma^2_1 = \sigma^2_2 = \sigma^2_3 = \sigma^2_4$ ; and

$C_2$ : Not all  $\sigma^2_j$  are equal

where  $\sigma^2_j$  is the variance at factor level  $j$  is

If  $H^* \leq 14.5$ , conclude  $C_1$ ;

otherwise conclude  $C_2$ .

The test statistic to assess the validity of the normal distribution assumption is based on a correlation of the residual terms with their normalized scores at each factor level. The critical correlation coefficient given  $n_j = 8$  is .903 at a significance level of

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<sup>14</sup>Ibid., p. 514.    <sup>15</sup>Ibid., p. 830.

$\alpha = .05$ .<sup>16</sup> This significance level for the normality test is taken because the Hartley test is quite sensitive to departures from the assumption of normal populations.<sup>17</sup> Thus, to decide between:

$C_1$ : The residual terms are normally distributed; and

$C_2$ : The residual terms are not normally distributed is:

if the correlation coefficient is  $\geq .903$ , conclude  $C_1$ ; otherwise  $C_2$ .

The independence and randomness of error terms assumption was controlled for by the experimental design. Subjects were only used once and were randomly assigned to conditions. The same accomplice was in all the sessions, but the order of the sessions was randomized with respect to the four conditions.

The methodology related to the F test, estimation of factor effects, and the ANOVA model assumptions is utilized below as appropriate to assess the effects of the allowed interactive communication as the participation factor.

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<sup>16</sup>This test is described by Thomas A. Ryan, Jr., Brian L. Joiner and Barbara F. Ryan in the MINITAB II Reference Manual. The test consists of the correlation of the residual values with their equivalent values that would be expected from the same sample size drawn from a standard normal distribution (that is,  $N(0,1)$ ). The test is described as similar to the Shapiro-Wilk test and a very powerful test for normality. pp. 43-45.

<sup>17</sup>Neter and Wasserman, Applied Linear Statistical Models, p. 513.



### Subordinate Analysis of the Process Content

The six relationships drawn from the coorientation model in the previous chapter to represent subordinate analysis of the content of the participative budgeting process are analyzed below as response variables to interactive communication.

#### Understanding (Response 1)

A measure of subordinate understanding of the budgeting situation was computed by matching subject responses to the questions described in the previous chapter with those of the accomplice.<sup>18</sup> Each response was weighted equally and the number of responses that matched was summed to provide the measure of understanding.

The summary of sample data and the related analysis of variance for this measure are displayed in Tables 5-1 and 5-2 respectively. Since the attained correlation coefficient leads to the conclusion that the residual terms are normally distributed at each level, and the Hartley test ( $H^* = 8.0 < 14.5$ ) leads to the conclusion that the sample variances across levels are equal, the ANOVA model is considered appropriate. The F test ( $F^* = .02 < 2.95$ ) leads to the conclusion that there is no factor effect for understanding.

The major inference from these results for understanding is that Packet A was the only significant means of communicating the facts to subjects. The hypothesis that orientation and subsequent conditions or phases would achieve greater understanding than the no participation condition is not supported. The allowed interactive communication

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<sup>18</sup>Supra, p. 100.

TABLE 5-1

## SUMMARY OF SAMPLE DATA FOR SUBORDINATE UNDERSTANDING

Level	Sample Size	Mean	Normal Distribution Test Statistic	Standard Deviation	Variance	Equality of Variance H* Test Statistic
1	8	11.75	.998	3.85	14.82	8.0
2	8	11.62	.988	3.25	10.56	
3	8	11.87	.991	1.36	1.85	
4	8	11.50	.980	3.63	13.18	
			Critical Correlation: .903			Critical H: 14.5

TABLE 5-2

## ANALYSIS OF VARIANCE FOR SUBORDINATE UNDERSTANDING

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F* Test Statistic
Participation Error	3	.6	.2	.02 Critical F: 2.95
	28	282.2	10.1	
Total	31	282.9		

in these conditions had no apparent effect on changing subjects' perceptions of the facts as tested. On the other hand, these results suggest that subjects at each level started the budgeting process from the same point, as the sample mean and variation at each level correspond so closely to each other. Thus it may be inferred that the information provided in Packet A successfully instituted the experimental setting or baseline in each of the four conditions.

#### Accuracy (Responses 2 and 3)

Accuracy in perceiving the other vice president and in perceiving the president were measured as follows. Each subject's estimate of the other subject's evaluation and the accomplice's evaluation was recorded in terms of dollar amounts allocated to the various functions as discussed in the previous chapter.<sup>19</sup> Then, any difference between the dollar amount for each function as estimated by the subject and the other person's actual recorded dollar amount was computed and the absolute values of these differences were totaled to measure accuracy.<sup>20</sup>

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<sup>19</sup>Supra, pp. 100-104.

<sup>20</sup>This measurement approach casts a decrease in the value of the total difference as an increase in the value of the coorientation relationship. The absolute value was taken to preclude cancellations of amounts and to facilitate square root and logarithmic transformations needed in the analysis.

### Accuracy in Perceiving the Other Vice President (Response 2)

The summary of sample data and the related analysis of variance of the measure for subject accuracy in perceiving the other vice president are displayed in Tables 5-3 and 5-4 respectively. A square root transformation of the original measurement was necessary to establish constancy of variance. The transformed data meet the tests for the normal distribution and equality of variance assumptions and the F test allows the conclusion that there is a significant factor effect. Thus the family of pairwise comparisons of factor levels for this accuracy relationship is displayed in Table 5-5.

The comparisons in Table 5-5 demonstrate that accuracy in perceiving the other vice president is a nondecreasing variable over the four levels. With a family confidence coefficient of 90%, interactive communication in general leads to greater accuracy than no participation, as shown by the comparisons of the orientation, evaluation, and joint decision making conditions to the no participation condition; evaluation does not lead to greater accuracy than orientation, as the confidence interval contains zero, but joint decision making leads to greater accuracy than either orientation or evaluation. These results do not support the hypothesis that the significant increase in accuracy would occur in the evaluation phase. Instead, an initial significant increase occurs in orientation, and a second significant increase occurs in joint decision making.

These results indicate that, even though interactive communication is limited to the facts in orientation, this discussion allows

TABLE 5-3

SUMMARY OF SAMPLE DATA FOR SUBORDINATE ACCURACY IN PERCEIVING  
THE OTHER VICE PRESIDENT: SQUARE ROOT TRANSFORMATION  
OF ORIGINAL OBSERVATIONS

Level	Sample Size	Mean	Normal Distribution Test Statistic	Standard Deviation	Variance	Equality of Variance H* Test Statistic
1	8	69.6	.989	7.1	50.4	9.26
2	8	46.0	.974	9.9	98.0	
3	8	38.5	.912	21.6	466.6	
4	8	13.5	.988	15.8	249.6	
			Critical Correlation: .903			Critical H: 14.5

TABLE 5-4

ANALYSIS OF VARIANCE OF SQUARE ROOT TRANSFORMED DATA  
FOR SUBORDINATE ACCURACY IN PERCEIVING  
THE OTHER VICE PRESIDENT

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F* Test Statistic
Participation Error	3	12806	4269	19.75
	28	6053	216	Critical F: 2.95
Total	31	18859		



TABLE 5-5

CONFIDENCE INTERVALS FOR DIFFERENCES IN SQUARE ROOT  
 TRANSFORMED FACTOR LEVEL MEANS FOR SUBORDINATE  
 ACCURACY IN PERCEIVING THE OTHER VICE PRESIDENT:  
 90% FAMILY CONFIDENCE COEFFICIENT

Pairwise Comparison (Factor Levels)	Confidence Interval
Orientation to No Participation (2,1)	$-41.2 \leq U_2 - U_1 \leq -6.0$
Evaluation to No Participation (3,1)	$-48.7 \leq U_2 - U_1 \leq -13.5$
Joint Decision Making to No Participation (4,1)	$-73.7 \leq U_4 - U_2 \leq -38.5$
Evaluation to Orientation (3,2)	$-25.1 \leq U_3 - U_2 \leq 10.1$
Joint Decision Making to Orientation (4,2)	$-50.1 \leq U_4 - U_2 \leq -14.9$
Joint Decision Making to Evaluation (4,3)	$-42.6 \leq U_4 - U_3 \leq -7.4$

subjects to estimate each other's position with greater accuracy than no interactive communication at all. Thus, the sharing of the facts evidently leads to some insights by each subject as to what the other is thinking. The lack of a further significant increase in the evaluation phase suggests that, since many ideas and suggestions may be exchanged, each subject may not be exactly sure which of the evaluations exposed best represents the one actually held by the other subject. However, the mean response in the evaluation phase is greater than the orientation phase, suggesting that the exposure of evaluations may lead to increased accuracy. The significant increase in joint decision making indicates that as the final evaluations are considered, each subject can perceive more correctly the position of the other subject relative to earlier phases and no participation at all.

The multiple comparisons demonstrate that the all channel communication network facilitates increased accuracy in perceiving the other subject, as the three conditions which used this network each achieved significantly greater accuracy than the control group, which was limited to the wheel network.

#### Accuracy in Perceiving the President (Response 3)

The summary of sample data and the analysis of variance for the measure of subject accuracy in perceiving the president are displayed in Tables 5-6 and 5-7 respectively. A logarithmic transformation of the original measurement was necessary to meet the tests for the normal distribution and constancy of variance assumptions.

TABLE 5-6

SUMMARY OF SAMPLE DATA FOR SUBORDINATE ACCURACY IN PERCEIVING  
THE PRESIDENT: LOGARITHMIC TRANSFORMATION OF  
ORIGINAL OBSERVATIONS

Level	Sample Size	Mean	Normal Distribution Test Statistic	Standard Deviation	Variance	Equality of Variance H* Test Statistic
1	8	3.378	.978	.410	.168	6.8
2	8	3.217	.973	.337	.114	
3	8	2.945	.983	.385	.148	
4	8	.469	.998	.881	.776	
			Critical Correlation: .903			Critical H: 14.5

TABLE 5-7

ANALYSIS OF VARIANCE OF LOGARITHMIC TRANSFORMED DATA  
FOR ACCURACY IN PERCEIVING THE PRESIDENT

Sources of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F* Test Statistic
Participation Error	3	44.856	14.952	49.57
	28	8.446	.302	Critical F: 2.95
Total	31	53.302		

The F test allows the conclusion of a significant factor effect. The family of comparisons for this accuracy relationship is displayed in Table 5-8.

The comparisons in Table 5-8 demonstrate that, contrary to the other accuracy relationship, while accuracy does not decrease over the first three levels, only joint decision making leads to a significant increase. These results do not support the hypothesis that accuracy would significantly increase in the evaluation phase. However, the means over the four levels are in the direction of increased accuracy, and the results do demonstrate that accuracy in perceiving the president does significantly increase in the joint decision making phase.

The findings suggest that the joint decision making phase is necessary for the subjects to be more certain of the president's evaluation, just as for the accuracy in perceiving the other vice president. In the evaluation phase, since the president makes the decision alone, subjects may well have thought that the final decision would be somewhat different than the suggestions and ideas discussed, since the president would perhaps be "thinking it over" before deciding. In the orientation phase, it was not expected that subordinates would accurately perceive the president's position, as no evaluations were discussed.

Taken together, these obtained results link interactive communication in the joint decision making phase to accuracy. Significant increases occurred for both accuracy relationships in the presence of

TABLE 5-8

CONFIDENCE INTERVALS FOR DIFFERENCES IN LOGARITHMIC  
 TRANSFORMED FACTOR LEVEL MEANS FOR ACCURACY IN  
 PERCEIVING THE PRESIDENT:  
 90% FAMILY CONFIDENCE COEFFICIENT

Pairwise Comparison (Factor Levels)	Confidence Interval
Orientation to No Participation (2,1)	$-.820 < U_2 - U_1 \leq .498$
Evaluation to No Participation (3,1)	$-1.092 \leq U_3 - U_1 \leq .226$
Joint Decision Making to No Participation (4,1)	$-3.568 \leq U_4 - U_1 \leq -2.250$
Evaluation to Orientation (3,2)	$-.931 \leq U_3 - U_2 \leq .387$
Joint Decision Making to Orientation (3,2)	$-3.407 \leq U_4 - U_2 \leq -2.089$
Joint Decision Making to Evaluation (4,3)	$-3.135 \leq U_4 - U_3 \leq -1.817$



such communication, and were not found in its complete absence.

#### Congruency (Responses 4 and 5)

Congruency with the other vice president and congruency with the president were measured by comparing the subject's own evaluation in terms of the dollar amount allocated to each function with the estimate of the other person's evaluation concerning the allocation of resources. The measure was computed in the same manner as for accuracy.

#### Congruency with the Other Vice President (Response 4)

The summary of sample data and the analysis of variance for the measure of subject congruency with the other vice president are displayed in Tables 5-9 and 5-10 respectively. A square root transformation of the original measurements was necessary to meet the tests for the normality distribution and the constancy of variance assumptions. The normality assumption is not met for the evaluation condition at the established significance level. However, Neter and Wasserman point out that the fixed effects ANOVA model is not much affected by departures from normality, provided the departure is not of extreme form.<sup>21</sup> Given that the departure is limited to one level, the ANOVA model is considered appropriate. The F test leads to the conclusion that there is no significant factor effect for congruency with the other vice president.

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<sup>21</sup>Neter and Wasserman, Applied Linear Statistical Models, pp. 513-514.

TABLE 5-9

SUMMARY OF SAMPLE DATA FOR SUBORDINATE CONGRUENCY WITH THE  
OTHER VICE PRESIDENT: SQUARE ROOT TRANSFORMATION OF  
ORIGINAL OBSERVATIONS

Level	Sample Size	Mean	Normal Distribution Test Statistic	Standard Deviation	Variance	Equality of Variance H* Test Statistic
1	8	32.6	.945	25.4	645.2	4.5
2	8	32.4	.959	12.0	144.0	
3	8	26.3	.815	20.9	436.8	
4	8	12.2	.966	15.7	246.5	
			Critical Correlation: .903			Critical H: 14.5

TABLE 5-10

ANALYSIS OF VARIANCE OF SQUARE ROOT TRANSFORMED DATA FOR  
SUBORDINATE CONGRUENCY WITH THE OTHER VICE PRESIDENT

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F* Test Statistic
Participation	3	2217	739	2.00
Error	28	10325	369	
Total	31	12542		Critical F: 2.95

These results are consistent with the hypothesis that congruency by itself would be difficult to predict, although the general direction of the means points toward increased congruency over the four levels. The lack of a significant factor effect indicates that, while interactive communication was found to lead to significant increases in each subject's perception of the other vice president's evaluation, (accuracy), it did not result in a significant change in evaluations by each subject to be congruent with the other vice president. Thus, subjects were not able to persuade each other to change evaluations to any significant degree.

#### Congruency with the President (Response 5)

The summary of sample data and the analysis of variance of the measure for subject congruency with the president are displayed in Tables 5-11 and 5-12 respectively. A logarithmic transformation of the original measurement to meet the tests for the normal distribution and constancy of variance assumptions leads to the same conclusions as those for congruency with the other vice president. Thus despite the departure from normality in the third condition, the ANOVA model is considered appropriate to analyze the data. As the F test leads to the conclusion of a significant factor effect, the family of comparisons is displayed in Table 5-13.

The comparisons in Table 5-13 demonstrate that the significant factor level is joint decision making relative to the orientation phase. Participation does not significantly increase congru-

TABLE 5-11

SUMMARY OF SAMPLE DATA FOR SUBORDINATE CONGRUENCY WITH THE  
PRESIDENT: LOGARITHMIC TRANSFORMATION OF  
ORIGINAL OBSERVATIONS

Level	Sample Size	Mean	Normal Distribution Test Statistic	Standard Deviation	Variance	Equality of Variance H* Test Statistic
1	8	2.32	.937	1.13	1.27	9.19
2	8	2.89	.951	.45	.20	
3	8	2.34	.892	1.05	1.11	
4	8	1.18	.979	1.31	1.72	
			Critical Correlation: .903			Critical H: 14.5

TABLE 5-12

ANALYSIS OF VARIANCE OF LOGARITHMIC TRANSFORMED DATA FOR  
SUBORDINATE CONGRUENCY WITH THE PRESIDENT

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F* Test Statistic
Participation Error	3	12.30	4.10	3.82
	28	30.08	1.07	Critical F: 2.95
Total	31	42.38		

TABLE 5-13

CONFIDENCE INTERVALS FOR DIFFERENCES IN LOGARITHMIC  
 TRANSFORMED FACTOR LEVEL MEANS FOR SUBORDINATE  
 CONGRUENCY WITH THE PERSIDENT:  
 90% FAMILY CONFIDENCE COEFFICIENT

Pairwise Comparison (Factor Levels)	Confidence Interval
Orientation to No participation (2,1)	$-.67 \leq U_2 - U_1 \leq 1.81$
Evaluation to No Participation (3,1)	$-.65 \leq U_3 - U_1 \leq 1.83$
Joint Decision Making to No Participation (4,1)	$-2.38 \leq U_4 - U_1 \leq .10$
Evaluation to Orientation (3,2)	$-1.79 \leq U_3 - U_2 \leq .69$
Joint Decision Making to Orientation (4,2)	$-2.95 \leq U_4 - U_2 \leq -.47$
Joint Decision Making to Evaluation (4,3)	$-2.40 \leq U_4 - U_3 \leq .08$



ency with the president relative to any other level, including no participation. This finding is consistent with the hypothesis that congruency, by itself, is difficult to predict. The limited results obtained indicate that interactive communication as operationalized in this study may not be particularly functional in achieving congruency. That is, persuasion of participants by each other did not occur relative to the lack of participation but to an earlier phase of the budgeting process. On the other hand, the significant result obtained for joint decision making viewed in conjunction with the comparisons of joint decision making and each of the other two conditions, does suggest that this phase has the most potential of the three phases of the participative process to bring about the necessary changes in participant evaluation so that each person is in fact congruent with the budget decision made. That is, the opportunity for mutual persuasion exists in the joint decision making phase.

#### Agreement (Response 6)

Subject agreement with the final budget was measured by comparing each subject's own evaluation concerning the resource allocations to be made with the final budget adopted. This measure was computed in a manner similar to that for accuracy and congruency.

The summary of sample data and the analysis of variance for the measure of subject agreement with the final budget are displayed in Tables 5-14 and 5-45 respectively. A square root transformation of

TABLE 5-14

SUMMARY OF SAMPLE DATA FOR SUBORDINATE AGREEMENT WITH THE  
FINAL BUDGET: SQUARE ROOT TRANSFORMATION OF  
ORIGINAL OBSERVATIONS

Level	Sample Size	Mean	Normal Distribution Test Statistic	Standard Deviation	Variance	Equality of Variance H* Test Statistic
1	8	47.0	.992	15.4	237.2	3.6
2	8	50.1	.925	16.5	272.3	
3	8	32.1	.924	21.5	462.3	
4	8	8.7	.985	11.3	127.7	
			Critical Correlation: .903			Critical H: 14.5

TABLE 5-15

ANALYSIS OF VARIANCE OF SQUARE ROOT TRANSFORMED DATA FOR  
SUBORDINATE AGREEMENT WITH THE FINAL BUDGET

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F* Test Statistic
Participation	3	8590	2863	10.43
Error	28	7690	275	Critical F: 2.95
Total	31	16280		

the original measurements was necessary to meet the tests for the normal distribution and equality of variance assumptions. The ANOVA model is considered appropriate and as the F test leads to the conclusion of a significant factor effect, the family of comparisons is displayed in Table 5-16.

The comparisons for agreement demonstrate that the interactive communication in joint decision making leads to significantly increased agreement over all other levels, thus supporting the hypothesis for this phase concerning agreement. Also, the comparison of the evaluation phase against the orientation phase suggests that the exposure of alternative resource allocation evaluations may be helpful in bringing about closer agreement than would exist in orientation only, thus indicating that persuasion may have occurred to some extent in evaluation as hypothesized for this condition.

Taken together, the results for subordinate analysis of the content of the participative budgeting process indicate that the coorientation model variables utilized to represent the subordinate analysis captured several significant effects of the allowed interactive communication in the experiment. These results indicate that, in this setting, subordinate participation must occur in all three phases of the budgeting process for significant increases in the evaluation based variables to occur, since joint decision making includes the allowed interactive communication of earlier phases. The results also indicate that the level of understanding, as measured in this study, achieved by reading typical accounting reports is not

TABLE 5-16

CONFIDENCE INTERVALS FOR DIFFERENCES IN SQUARE ROOT  
 TRANSFORMED FACTOR LEVEL MEANS FOR SUBORDINATE  
 AGREEMENT WITH THE FINAL BUDGET:  
 90% FAMILY CONFIDENCE COEFFICIENT

Pairwise Comparison (Factor Levels)	Confidence Interval
Orientation to No Participation (2,1)	$-16.8 \leq U_2 - U_1 \leq 23.0$
Evaluation to No Participation (3,1)	$-34.8 \leq U_3 - U_1 \leq 5.0$
Joint Decision Making to No Participation (4,1)	$-58.2 \leq U_4 - U_1 \leq -18.4$
Evaluation to Orientation (3,2)	$-37.9 \leq U_3 - U_2 \leq 1.9$
Joint Decision Making to Orientation (4,2)	$-61.3 \leq U_4 - U_2 \leq -21.5$
Joint Decision Making to Evaluation (4,3)	$-43.3 \leq U_4 - U_3 \leq -3.5$

affected by subsequent interactive communication in the time frame provided.

#### Subordinate Attitudes Toward the Budget

Three subordinate attitudes toward the final budget were each measured utilizing a five point Likert-type scale in the final step of the experiment. The analysis of the measures obtained for subordinate satisfaction, perceived correctness, and commitment regarding the final budget is discussed below.<sup>22</sup>

#### Satisfaction (Response 7)

The summary of sample data and the analysis of variance for the measure of subordinate satisfaction are displayed in Tables 5-17 and 5-18 respectively. The normal distribution and equality of variance assumption tests are met, and the F test leads to the conclusion of no significant factor effects on satisfaction.

These results do not support the hypothesis that participation leads to increased satisfaction as a more favorable attitude toward the budget. The mean response for satisfaction across conditions, while suggestive only, indicates that if satisfaction does increase, it would not do so until the joint decision making phase of the process.

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<sup>22</sup>The analysis of the results of the attitude measures was conducted with the same ANOVA model and techniques used for the co-orientation variables. Because the attitude scales may have only ordinal properties the non-parametric Kruskal-Wallis one-way analysis of variance procedures may be theoretically more appropriate. However, the robustness of the F test is considered an adequate



TABLE 5-17

SUMMARY OF SAMPLE DATA FOR SUBORDINATE SATISFACTION  
WITH THE FINAL BUDGET

Level	Sample Size	Mean	Normal Distribution Test Statistic	Standard Deviation	Variance	Equality of Variance H* Test Statistic
1	8	3.00	.966	.93	.86	2.3
2	8	3.00	.999	1.41	1.99	
3	8	2.75	.999	1.04	1.08	
4	8	4.00	.975	1.31	1.72	
			Critical Correlation: .903			Critical H: 14.5

TABLE 5-18

ANALYSIS OF VARIANCE FOR SUBORDINATE SATISFACTION  
WITH THE FINAL BUDGET

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F* Test Statistic
Participation	3	7.37	2.46	1.74
Error	28	39.50	1.41	Critical F: 2.95
Total	31	46.87		

### Perceived Correctness (Response 8)

The summary of sample data and analysis of variance for the measure of perceived correctness of the final budget are displayed in Tables 5-19 and 5-20 respectively. The ANOVA model assumption tests are met and the F test leads to the conclusion of a significant factor effect. Thus, the family of comparisons for perceived correctness is displayed in Table 5-21.

The family of comparisons indicates that the joint decision making phase leads to significantly increased perceived correctness relative to no participation. These results support the hypothesis that such a perception would occur in the joint decision making phase. Also of interest is that the means consistently increase over the three phases of the budgeting process, though not significantly so.

### Commitment (Response 9)

The summary of sample data and the analysis of variance for the measure of commitment to the final budget are displayed in Tables 5-22 and 5-23 respectively. Both tests for the ANOVA model assumptions are met. While the F ratio does not exceed the critical value for the criterion level of  $\alpha = .05$ , the attained level of significance for the observed F ratio is .057.<sup>23</sup> This strongly suggests that increased commitment results from participation, although the criterion for rejection of the null hypothesis is not achieved in this

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basis to utilize the parametric approach as the results are not likely to be significantly different from those of the nonparametric test.

<sup>23</sup> Neter and Wasserman, Applied Linear Statistical Models, p. 811.

TABLE 5-19

SUMMARY OF SAMPLE DATA FOR SUBORDINATE PERCEIVED CORRECTNESS  
OF THE FINAL BUDGET

Level	Sample Size	Mean	Normal Distribution Test Statistic	Standard Deviation	Variance	Equality of Variance H* Test Statistic
1	8	2.62	.998	1.06	1.12	2.3
2	8	2.87	.995	1.36	1.85	
3	8	3.75	.999	.89	.79	
4	8	4.12	.990	1.13	1.28	
			Critical Correlation: .903			Critical H: 14.5

TABLE 5-20

ANALYSIS OF VARIANCE FOR SUBORDINATE PERCEIVED CORRECTNESS  
OF THE FINAL BUDGET

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F* Test Statistic
Participation Error	3	12.09	4.03	3.21
	28	35.12	1.25	Critical F: 2.95
Total	31	47.22		

TABLE 5-21

CONFIDENCE INTERVALS FOR DIFFERENCES IN  
 FACTOR LEVEL MEANS FOR SUBORDINATE PERCEIVED  
 CORRECTNESS OF THE FINAL BUDGET:  
 90% FAMILY CONFIDENCE COEFFICIENT

Pairwise Comparison (Factor Levels)	Confidence Interval
Orientation to No Participation (2,1)	$-1.53 \leq U_2 - U_1 \leq 1.09$
Evaluation to No Participation (3,1)	$-.21 \leq U_3 - U_1 \leq 2.47$
Joint Decision Making to No Participation (4,1)	$.16 \leq U_4 - U_1 \leq 2.84$
Evaluation to Orientation (3,2)	$-.46 \leq U_3 - U_2 \leq 2.22$
Joint Decision Making to Orientation (4,2)	$-.09 \leq U_4 - U_2 \leq 2.59$
Joint Decision Making to Evaluation (4,3)	$-.57 \leq U_4 - U_3 \leq 1.71$

TABLE 5-22

## SUMMARY OF SAMPLE DATA FOR SUBORDINATE COMMITMENT TO THE FINAL BUDGET

Level	Sample Size	Mean	Normal Distribution Test Statistic	Standard Deviation	Variance	Equality of Variance H* Test Statistic
1	8	2.875	1.000	.835	.70	1.6
2	8	2.625	.998	1.061	1.13	
3	8	3.500	1.000	.826	.86	
4	8	3.875	.988	.991	.98	
			Critical Correlation: .903			Critical H: 14.5

TABLE 5-23

## ANALYSIS OF VARIANCE FOR SUBORDINATE COMMITMENT TO THE FINAL BUDGET

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F* Test Statistic
Participation Error	3	7.844	2.615	2.86
	28	25.625	.915	Critical F: 2.95
Total	31	33.469		



experiment. Further, the consistent increases in the mean responses for commitment over the three phases of the process suggest that if commitment does change, it will increase over these successive phases as a result of participation.

Taken together, the results for the attitude measures indicate that perceived correctness is a significant response and strongly suggest that commitment in terms of unwillingness to change the budget is a response to participation in the joint decision making phase of the budgeting process. Satisfaction with the budget, on the other hand, does not appear to be a response. As increased satisfaction has been found to be a result in other participation studies, however, the experimental task of this study may not have been sufficiently long or ego-involving to lead to significantly increased satisfaction. On balance these findings provide affirmative support for the question of whether more favorable subordinate attitudes toward the budget result from participation in the budgeting process, if participation as allowed interactive communication occurs in all three phases.

The next section of the chapter examines the relationships between the subordinate content analysis and these attitudes as a means to provide empirical evidence for how subordinate attitudes toward the budget result from participation in budgeting.

Relationships Among Response Variables  
Within Groups

The subordinate analysis of the content of the participative budgeting process was hypothesized to lead to more favorable subordinate attitudes toward the budget. The investigation above of the significant differences in the coorientation variables representing this subordinate content analysis and these attitudes as responses to participation with the ANOVA model and related procedures focused on the mean responses of the groups at each factor level or condition of the experiment. The relationships among these response variables investigated in this section focuses on the variation of these responses within each condition. The statistical method employed to assess these relationships is discussed below.

Statistical Method

Since both many of the content analysis variables and the attitudes toward the budget were determined to be responses to the qualitative factor of participation, the exact nature of the statistical relationship among these variables cannot be specified as might be the case if participation were quantitative. However, the conceptual basis for the hypotheses that the subordinate analysis of the content leads to more favorable attitudes was previously established, and the use of a simple correlation technique is considered appropriate to establish the existence of relationships between these

response variables. Correlation only characterizes the existence of a relationship while saying nothing about the underlying reasons. It only indicates that the variables vary together either positively or negatively.<sup>24</sup> Thus the analysis of the relationships below relies on the conceptual basis established earlier for the explanation of any empirical evidence concerning significant relationships found by the correlation between any two response variables. The technique utilized is the Pearson product-moment correlation.<sup>25</sup>

The Pearson product-moment correlation method calculates an index,  $r$ , characterizing the degree of linear relationship between two variables. This index provides the magnitude and the direction, either positive or negative, of the extent to which these variables tend to move together. The significance of the correlation index can be tested by determining the probability that the value, and also the direction, if desired, of any index found is due to sampling error. The probabilities of index values for given sample sizes have been tabled to allow the testing of the significance of the value and the direction of correlation attained for a specified criterion level of significance. As the analysis below is within each condition or level of the experiment, the sample size is eight. The criterion significance level has been set at  $\alpha = .05$ . Since the

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<sup>24</sup>Frederick Williams, Reasoning With Statistics (New York: Holt, Rinehard and Winston, Inc., 1968) pp. 127-128.

<sup>25</sup>Ibid., pp. 130-136.

response variables are hypothesized to vary in the same direction, a one-tailed or directional test is considered appropriate. Given these conditions, the critical value for the index  $r$  is  $+0.549$ .<sup>26</sup> A sample correlation index greater than  $+0.549$  allows rejection of the null hypothesis of no significant relationship between two variables. Thus, the decision rule to decide between

$C_1$ : Any two response variables are uncorrelated ( $\rho = 0$ ); and

$C_2$ : Any two response variables are positively correlated ( $\rho > 0$ ); where  $\rho$  is the population correlation coefficient;

is

If  $r \leq +0.549$  conclude  $C_1$ ;  
otherwise conclude  $C_2$ .

A correlation index greater than  $+0.549$  allows the conclusion that the two response variables are related with a 95% confidence coefficient.

#### Conditions

The product-moment correlations within each condition or factor level of the experiment are displayed in Tables 5-24 through 5-27. Each significant correlation index is denoted by (\*). If an attained correlation is significant in the negative direction, it is denoted by (\*\*). Since the measurement techniques for the evaluation based on orientation variables cast increasing values of these relationships in terms of decreasing numerical values, the signs of these numerical values were reversed to establish the same direction for the evaluation

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<sup>26</sup> Biometrika Tables for Statisticians, Volume I, ed. by E. S. Pearson and H. O. Hartley (Cambridge: Cambridge University Press, 1954), Table 13, p. 138.

TABLE 5-24

CORRELATION OF SUBORDINATE CONTENT ANALYSIS  
AND ATTITUDES TOWARD THE BUDGET IN THE  
NO PARTICIPATION CONDITION (FACTOR LEVEL 1)

	Subordinate Content Analysis						Subordinate Attitudes Toward The Budget	
	Understanding	Accuracy in Perceiving the Other Vice Pres.	Accuracy in Perceiving the President	Congruency with the Other Vice Pres.	Congruency with the President	Agreement with the Final Budget	Satisfaction	Perceived Correctness
Accuracy in Perceiving the Other Vice Pres.	-.381							
Accuracy in Perceiving the President	-.176	.284						
Congruency with the Other Vice Pres.	.086	.470	.484					
Congruency with the President	-.045	.396	.133	.844*				
Agreement with the Final Budget	-.346	.478	.587*	-.141	-.298			
Satisfaction	.441	.036	-.026	.505	.364	.439		
Perceived Correctness	.447	.044	.352	.571*	.605*	.818*	.727*	
Commitment	.056	.063	.602*	.192	.487	.752*	.555*	.746*



TABLE 5-25

CORRELATION OF SUBORDINATE CONTENT ANALYSIS  
AND ATTITUDES TOWARD THE BUDGET IN THE  
ORIENTATION CONDITION (FACTOR LEVEL 2)

	Subordinate Content Analysis						Subordinate Attitudes Toward The Budget	
	Understanding	Accuracy in Perceiving the Other Vice Pres.	Accuracy in Perceiving the President	Congruency with the Other Vice Pres.	Congruency with the President	Agreement with the Final Budget	Satisfaction	Perceived Correctness
Accuracy in Perceiving the Other Vice Pres.	.254							
Accuracy in Perceiving the President	-.051	-.206						
Congruency with the Other Vice Pres.	.490	.394	.429					
Congruency with the President	.254	.335	.402	.947*				
Agreement with the Final Budget	-.081	-.038	.892*	.689*	.603*			
Satisfaction	.215	-.103	.499	.277	.416	.257		
Perceived Correctness	.311	-.233	.412	.189	.339	.152	.968*	
Commitment	.244	-.277	.143	.301	.397	.013	.762*	.857*

TABLE 5-26

CORRELATION OF SUBORDINATE CONTENT ANALYSIS  
AND ATTITUDES TOWARD THE BUDGET IN THE  
EVALUATION CONDITION (FACTOR LEVEL 3)

	Subordinate Content Analysis						Subordinate Attitudes Toward The Budget	
	Understanding	Accuracy in Perceiving the Other Vice Pres.	Accuracy in Perceiving the President	Congruency with the Other Vice Pres.	Congruency with the President	Agreement with the Final Budget	Satisfaction	Perceived Correctness
Accuracy in Perceiving the Other Vice Pres.	.294							
Accuracy in Perceiving the President	.206	-.147						
Congruency with the Other Vice Pres.	-.247	.452	.394					
Congruency with the President	-.511	.196	.133	.784*				
Agreement with the Final Budget	.084	.206	.862*	.700*	.285			
Satisfaction	-.382	.395	-.366	-.562**	-.544	-.346		
Perceived Correctness	.505	-.524	.258	.121	.525	.089	-.389	
Commitment	-.626**	-.606**	-.502	-.476	-.072	-.592**	.000	.522

TABLE 5-27

CORRELATION OF SUBORDINATE CONTENT ANALYSIS  
AND ATTITUDES TOWARD THE BUDGET IN THE  
JOINT DECISION MAKING CONDITION (FACTOR LEVEL 4)

	Subordinate Content Analysis						Subordinate Attitudes Toward The Budget	
	Understanding	Accuracy in Perceiving the Other Vice Pres.	Accuracy in Perceiving the President	Congruency with the Other Vice Pres.	Congruency with the President	Agreement with the Final Budget	Satisfaction	Perceived Correctness
Accuracy in Perceiving the Other Vice Pres.	-.169							
Accuracy in Perceiving the President	-.755**	.479						
Congruency with the Other Vice Pres.	-.232	.851*	.652*					
Congruency with the President	-.353	.900*	.700*	.936*				
Agreement with the Final Budget	-.426	.726*	.812*	.947*	.933*			
Satisfaction	-.857**	.372	.930*	.486	.531	.635*		
Perceived Correctness	-.903**	.517	.839*	.434	.608*	.566*	.872*	
Commitment	-.656**	.551	.889*	.726*	.778*	.857*	.771*	.784*

based variables as the understanding and attitude variables for the correlation procedures.

Control (Factor Level 1)

Table 5-24 displays a matrix of the product-moment correlations between all pairs of the nine response variables in the control condition. Conceptually, there is no reason to expect any significant relationships in this condition as subjects were in isolation and no interactive communication occurred. However, because the budgeting situation was relatively well structured to facilitate the completion of the experimental task within the two hour time frame, subjects could by chance estimate the other evaluations in a range close to these of conditions allowing interactive communication. The actual results were that the means of the response variables were generally the lowest in the control condition.

The results in Table 5-24 indicate that the more accurately subjects estimated the president's actual evaluation, the more their own evaluation agreed with the final imposed budget and the more they were committed to it (that is, less willing to change it). The more subjects happened to be congruent with each other, the more they happened to be congruent with the president, and these variables were related to perceived correctness of the imposed budget. Also, the more subjects own evaluations agreed with the final budget, the more they perceived it as correct and the more committed they were to it. Finally, the three attitude measures were related to each other.

The significant relationships found, while due to variation

around generally low mean values of the response variables, provide a possible insight as to why "pseudo-participation" can occur so easily. Even though no actual participation occurred, the fact that individuals tended to view the budgeting situation in somewhat similar fashion was associated with more favorable attitudes toward the budget. On the other hand, the results indicate to a considerable extent that in the absence of allowed interactive communication, the subordinate analysis of the content is extremely limited by the lack of a basis to attribute evaluations to the other vice president or the president. Thus, the significant relationships result solely from the subjects drawing somewhat similar conclusions from Packet A in isolation, and it is not expected that similar results would occur in less structured situations.

#### Orientation (Factor Level 2)

Table 5-25 displays the matrix of correlations between all pairs of the response variables for the orientation condition. The means of the response variables were generally higher in the orientation condition and accuracy in perceiving the president was significantly higher than the control condition. As only facts were discussed in orientation, the significant results displayed in Table 5-25 are considered attributable to similar evaluations which may have resulted indirectly from the limited interactive communication. Subjects who tended to be congruent with each other were also congruent with the president. The more accurately subjects estimated the president's evaluation the more they agreed with it as the final



budget. However, in contrast to the control condition, these content analysis variables did not relate to any of the attitude measures. The three attitude measures again were significantly related to each other, however.

The absence of any significant relationships between the content analysis variables and the attitudes in the orientation phase, in contrast to the control condition, suggests that the initiation of the participation process may provide subordinates in orientation a more realistic basis to assess both their roles and the content of the budgeting process as opposed to subordinates in the control condition. In control, even though the subjects were informed their budget recommendations were not considered, to the extent their evaluations were similar to the final budget, they may have thought they could have influenced the president and thus their limited analysis led to more favorable attitudes. Allowing discussion of the facts in orientation may have made each subject more aware of the limited possibility for influence, and individuals may well have thought that different alternatives should have been discussed. Hence, even as a subject's own evaluation was more similar to the imposed budget, little in the way of an external referent existed to assess whether the budget was correct, and no commitment or satisfaction resulted.

Evaluation (Factor Level 3)

The matrix of correlations of all pairs of response variables in the evaluation condition is displayed in Table 5-26. The means of the responses were, with some exceptions, generally higher in evaluation than in the control or orientation conditions. As this condition allowed both the discussion of the facts of the situation and alternative ideas, opinions, and suggestions concerning the resource allocations, the significant relationships displayed in the table are to some extent surprising. The more subjects understood the budgeting situation (that is, were cooriented with the accomplice), the less committed they were to the budget. The more accurately they perceived the president, the more they agreed with the budget, but again were less committed to it. Subjects' congruency with each other was significantly related to congruency with the president and to agreement, but this congruency was negatively related to satisfaction with the budget adopted. Further, the more subjects accurately perceived each other, the less committed they became to the imposed budget. Finally, the relationships between the attitudes found earlier in the control and orientation conditions are not seen in this condition.

The relationships found in evaluation indicate that allowing participation to the extent of discussing facts and alternative ideas and suggestions, but then imposing the budget, may create a potential problem. Since the findings indicate that to the extent each subordinate in this condition more accurately perceives the other subordi-

nate's evaluation, thinks more congruently with the president, agrees with the budget, and yet feels less committed to it and less satisfied with it, it can be argued that in this condition the subordinates don't particularly like to have their own budget imposed on them as the budget moves closer to what they recommended before the final decision. Put another way, subjects may have felt that all the president did was take their recommendation, change it somewhat, and send it back as the imposed budget. Thus, the attitudes toward the budget become less favorable.

Another possible explanation for these results is provided by Bales and Strodtbeck. They note that over the phases of their group problem solving process, both positive and negative social-emotional reactions tend to increase in terms of tension versus its release, solidarity versus antagonism, and agreement versus disagreement. It is only at the end of the final phase that the positive reactions reach their peak and the negative reactions are dispelled.<sup>27</sup> Thus, terminating the participation process at evaluation may well leave subordinates in a state of conflicting feelings.<sup>28</sup>

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<sup>27</sup> Bales and Strodtbeck, "Phases in Group Problem Solving," pp. 485-489.

<sup>28</sup> This possibility may have important implications for the cohesiveness question discussed in chapter three although not considered in the experiment.

#### Joint Decision Making (Factor Level 4)

The matrix of correlations of all pairs of response variables for the joint decision making condition is displayed in Table 5-27. The means of the response variables were all higher than those in previous conditions and most of the significant differences were found to be the result of this factor level. The many significant relationships displayed in Table 5-27 are discussed below.

The negative significant relationships between understanding and accuracy in perceiving the president and the attitudes toward the budget are in the opposite direction than hypothesized. One interpretation suggested by these results is that the negative relationship between understanding and accuracy implies that the subordinate thinks the president should evaluate the budgeting situation more in line with his own evaluation, since both are more cooriented to the budgeting situation. However, the subordinate is wrong in perceiving the president, and when the jointly decided budget is reached through consensus, the final budget is not the one considered to be optimal by the subordinate.

An alternative interpretation suggested by these results is that the less a subordinate understands the situation, the more likely he is to adopt favorable attitudes toward the budget, because he is influenced by, and also more certain of, the president's evaluation. This interpretation is supported by the fact that subordinate accuracy in perceiving the president is strongly positively related to the attitude variables and subject congruency with the president is

related to perceived correctness and commitment.

The lack of any positive findings between understanding and the evaluation based variables fails to support the hypothesized relationships. However, the lack of a significant increase in understanding while significant increases occurred for all of the evaluation based variables in this condition is one explanation for the absence of any relationships. Another possibility is that the measure of understanding utilized in this study was inappropriate to link the perception of facts to the evaluations of the budgeting situation.

The evaluation-based content analysis variables are all significantly related to each other except for the two accuracy measures. These results demonstrate that, as discussed in the conceptual development, as accuracy and agreement change, so also does congruency, even though congruency by itself is difficult to predict. Thus the joint decision making phase enables participants to analyze the content of the process such that as they become more accurate in perceiving each other's evaluations and more congruent with each other's evaluations, they agree more on the final budget. In effect, a mutual persuasion process occurs.

The evaluation-based variables representing subordinate analysis of the content in general led to more favorable attitudes as hypothesized for the variables based on the subordinate-president perspectives. The more accurately subordinates perceived the president, the more favorable were the attitudes toward the budget. The more



congruent subjects were with the president, the more subjects perceived the budget as correct and were committed to it. By contrast, accuracy and congruency relative to the other vice president was significantly related only to commitment. Finally, the more subjects agreed with the final budget, the more favorable the attitudes and, in turn, the attitudes were significantly correlated with each other.

These results indicate that, as Bales and Strodtbeck theorize, the end of the final phase of the process is the key aspect of achieving the favorable attitudes. The significant results suggest that, if any negative reactions did arise in the evaluation phase, they were dispelled in the joint decision making phase.

These evaluation-based variable linkages to more favorable attitudes also suggest that subordinates are more influenced by the president than each other, as only commitment was related to the other subordinate related accuracy and congruency variables.

On balance, these findings in the joint decision making phase provide considerable empirical evidence to explain how the more favorable subordinate attitudes toward the budget result from participation as allowed interactive communication.

#### Other Findings

Two other findings of interest concern the experimental treatment and the selection and assignment of subjects to the experimental conditions.

### Experimental Treatment

Given the extensive consideration of perceived subordinate influence on decisions made in prior research, subjects in the experimental treatment groups were asked appropriate questions concerning their perceived influence on the final budget. The responses are analyzed below as a means to assess the effectiveness of the experimental treatment on these groups.

Subjects in the orientation and evaluation conditions responded to a question concerning how much influence they had on the final budget. Subjects in the evaluation condition who could present ideas and suggestions should have perceived more influence than subjects in orientation who could discuss only the facts of the situation. Thus, the F test described earlier, was used to decide between:

$C_1$ : Perceived influence is the same in both the orientation, and evaluation conditions; and

$C_2$ : Perceived influence is not the same in both conditions.

The mean response for the evaluation condition of 3.63 corresponding to "a considerable amount" on a five point Likert scale was found to be significantly greater than the mean response of 2.75 corresponding to a "fair to little amount" for the orientation condition at a level of  $\alpha = .054$  for the F test of the comparison of the two means.<sup>29</sup>

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<sup>29</sup>The critical value for the F test at  $\alpha = .05$  for 1.14 degrees of freedom is 4.61 while the  $F^*$  from the ANOVA table was 4.57. The attained significance level was found by interpolation in Table A-4 of Neter and Wasserman, Applied Linear Statistical Models. A directional T test of the two means revealed the evaluation condition mean to be significantly greater than orientation at an  $\alpha = .03$ .

Thus, the experimental treatment was considered successful in these conditions.

Subjects in joint decision making responded to a question about their relative influence on the final budget. These subjects should have perceived that they each had an equal voice in determining the final budget. Six of the eight responses to the question were at the Likert scale level of 3, corresponding to "about as much influence as the other members." The other two were at the 4 level, corresponding to "somewhat more than the other members." Thus the treatment was considered successful in this condition as well.

#### Subject Selection and Assignment

The student volunteers used as subjects were asked to provide their cumulative grade point average. This measure was analyzed as a means to determine whether a homogeneous group had been selected and assigned to the experimental conditions to minimize the possibility of an initial selection bias. The ANOVA procedures were used for this analysis and the summary of sample data and the analysis of variance are displayed in Tables 5-28 and 5-29 respectively. The tests of the assumptions underlying the ANOVA model are met and the F test leads to the conclusion of no significant differences in grade point average across groups. Thus, the subject selection and random assignment to conditions was apparently successful in minimizing the possibility of initial bias.<sup>30</sup>

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<sup>30</sup>The grade point average for all seniors at the University where this study was undertaken is 2.96.

TABLE 5-28

## SUMMARY OF SAMPLE DATA FOR GRADEPOINT AVERAGE OF SUBJECTS

Level	Sample Size	Mean	Normal Distribution Test Statistic	Standard Deviation	Variance	Equality of Variance H* Test Statistic
1	8	3.03	.979	.28	.08	2.8
2	8	3.15	.972	.35	.12	
3	8	3.22	.952	.34	.12	
4	8	3.08	.912	.47	.22	
			Critical Correlation: .903			Critical H: 14.5

TABLE 5-29

## ANALYSIS OF VARIANCE FOR GRADEPOINT AVERAGE OF SUBJECTS

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F* Test Statistic
Factor Level				
Assigned	3	.162	.054	.40
Error	28	3.792	.135	Critical
Total	31	3.954		F: 2.95

### Summary

This chapter describes the analysis of the results of the study experiment that was designed to test hypotheses concerning whether and how more favorable subordinate attitudes toward the budget result from participation in the budgeting process.

The analysis of the experimental results provides empirical evidence in support of several of the hypothesized effects of participation as allowed interactive communication. These effects are summarized in Figure 5-2. The significant increase in perceived correctness of the budget coupled with the strong suggestion of an increase in commitment to the budget by subordinates provides affirmative support for the question of whether more favorable attitudes result from participation. The evaluation-based variables representing subordinate analysis of the content of participative budgeting that significantly increased as a result of participation were shown to be significantly associated with more favorable attitudes in the joint decision making phase, thus providing empirical evidence to support the conceptual basis for the explanation of how these more favorable attitudes result from participative budgeting.

As most of the significant differences and the relationships were found in the joint decision making condition, the full operation of the participative budgeting model appears to be the key to gaining more favorable attitudes toward the budget in this type of setting. Limiting participative budgeting to the evaluation phase may create undesirable relationships among the response variables. Limiting participative budgeting to the orientation phase appears to be of



Fig. 5-2. Summary of Significant Differences

Participation (at the factor level of):	Was Shown in Table:	To Lead to Significantly Greater (Response):	Than (the factor level):
Joint Decision Making (4)	5-5	Accuracy in Per- ceiving the Other Vice Pres. (2)	No Participation (1) Orientation(2) Evaluation (3)
	5-8	Accuracy in Perceiving the President (3)	No Participation (1) Orientation (2) Evaluation (3)
	5-13	Congruency with the President (5)	Orientation (2)
	5-16	Agreement with the Final Budget (6)	No Participation (1) Orientation (2) Evaluation (3)
	5-21	Perceived Cor- rectness of the Final Budget (8)	No Participation (1)
Evaluation (3)	5-5	Accuracy in Per- ceiving the Other Vice Pres. (2)	No Participation (1)
Orientation (2)	5-5	Accuracy in Per- ceiving the Other Vice Pres. (2)	No Participation (1)

limited value in terms of generating more favorable attitudes.

The findings concerning the experimental treatment and the subject selection and assignment provide supportive evidence for the internal validity of the experiment. Thus, the empirical evidence generated by the experiment is considered appropriate as the basis for the conclusions and implications discussed in the next chapter.

## CHAPTER SIX

## SUMMARY AND CONCLUSIONS

This study was undertaken to develop a general model of participative budgeting and to initiate a systematic exploration of its operation and effects. A communication process approach, based on prior research in participation concerned with subordinate influence and with shared control of the decision making process by management with subordinates integrated the managerial planning function, alternative decision style methods, and a group problem solving process to develop a participative budgeting model. This model specifies management and subordinate roles and interactive communication between them over three phases to develop the budget. These phases are: orientation, in which communication concerns the facts of the budgeting situation; evaluation, in which alternative ideas, opinions, and suggestions are discussed; and joint decision making, in which consensus is reached on the final budget. This interactive communication as participation was hypothesized to enable subordinate analysis of the content of the budgeting process which in turn would lead to more favorable subordinate attitudes toward the budget.

The experimental operation of the model in a laboratory setting varied the interactive communication between participants. The results of the experiment, analyzed in the previous chapter, provide the basis for the major conclusions and implications discussed below.

The limitations and recommended extensions of this research are then outlined to conclude the report of the study.

### Conclusions

The conclusions concern three major areas: the experimental findings as they relate to the prior research discussed in chapter two; implications concerning participant relationships that emerged in the experimental setting; and implications for the viability of the communication process approach to the investigation of participative budgeting. These conclusions should be interpreted in the context of the experimental setting. The same information packet was provided to all participants and the experimental task was accomplished within a two hour time frame. Also, the budgeting situation was fairly well structured to facilitate the completion of the task. Thus the budget decisions that resulted over the four experimental conditions are quite similar, and the likelihood of the budget decision as a confounding variable is not considered great. That is, the results are considered to lead more directly to the conclusions below than would be the case if the decisions had varied greatly over the experimental conditions.

#### Relationship of Findings to Prior Research

Four major conclusions relate to the prior research. They concern the Becker and Green research, the Foran and DeCoster study, the research classified as the influence approach to participation and the research considered as the shared control approach.

### Becker and Green Research

The experimental results support the hypothesis based on the Becker and Green research that direction of the interaction process to enable participant analysis of the content would result in more favorable attitudes toward the budget. Most of the significant effects of the allowed interactive communication on the content analysis and attitude response variables and the significant relationships between them occurred in the joint decision making phase of the model. Thus the full operation of the participative budgeting model is considered necessary in this setting to gain more favorable attitudes toward the budget.

The unexpected relationships among the response variables that occurred by limiting participation to the evaluation phase suggest that, if increased cohesiveness also results from participation as Becker and Green hypothesize, a potential problem may arise. Specifically, if increased cohesiveness occurs in the evaluation phase, the interaction of the subordinate positive attitudes toward each other and negative attitudes toward the budget may create an undesirable balanced state of attitudes from management's perspective.<sup>1</sup>

### Foran and DeCoster Study

The experimental results relate to the use of alternative communication networks and elements of the commitment factor in the Foran and DeCoster study. The experiment utilized the wheel and all

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<sup>1</sup>The conceptual basis for this possibility is discussed in chapter three. Supra pp. 54-58.



channel communication networks as did their study. The wheel network was used in the control or no participation condition and the all channel was used in each of the treatment conditions. By not allowing the possibility of psuedo-participation to arise through the occurrence of feedback in the wheel network, which happened in the Foran and DeCoster experiment, the experimental results provide support for their hypothesis that significant effects would be related to the use of these alternative networks. Specifically, all of the significant increases in the response variables of this experiment occurred in the treatment conditions using an all channel network.

The significant correlations between the attitudes toward the budget that resulted in three of the four experimental conditions provide empirical support for the Foran and DeCoster commitment factor which included these attitudes. These correlations are consistent with their results since the factor analysis procedure they utilized establishes which of several variables tend to move together and thus may measure something in common.<sup>2</sup> On the other hand, their factor may obscure the relative strengths of these attitudes, as perceived correctness was significantly greater, increased commitment was strongly suggested and no strong effect existed for satisfaction in this experiment.

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<sup>2</sup>Williams, Reasoning with Statistics, p. 151.

### Participation as Influence Research

The research concerning the perception of influence by subordinates on the decisions made had strongly suggested, but never made explicit, the linkage between this perception and interactive communication. The assessment of the experimental treatment which indicated an increase in the perception of influence by subordinates corresponding to the controlled increase in allowed interactive communication from the orientation to the evaluation phase demonstrates this linkage.

### Participation as Shared Control Research

The research concerning the sharing of control of the decision making process by management with subordinates strongly suggested communication network and information variation as the operational means to this sharing of control. As all of the significant increases in the responses resulted from the experimental treatment in all channel networks, these results suggest further support for this approach. Also, the perception by subordinates in the joint decision making condition that they had about as much influence or somewhat more influence as the other participants on the final budget suggests that they may have felt their input was incorporated in the final budget. Thus the control was apparently fully shared in the joint decision making phase which involved the use of an all channel communication network.

### Participant Relationships

The experimental results indicate that to some extent the accomplice in the role of president was influenced by the subordinates as the imposed decisions in the orientation and subsequent phases did vary somewhat. Thus the perception of influence reported in these conditions is consistent with these results. The budgets adopted in the sessions of the joint decision making condition were in fact reached through consensus, and hence the relatively equal influence perceived by subordinates is consistent with that result as well.

Two findings relative to the subordinate content analysis variables suggest that the accomplice as president may have had considerable influence on the subjects as subordinates. They concern the significant correlations between the content analysis variables and attitudes found in the joint decision making phase and the transformations required to stabilize the variances in the measures of accuracy and congruency.

The significant correlations between subordinate content analysis variables relative to the president and the attitude variables were far more numerous than those between the same types of response variables relative to the other subordinate and the same attitudes. This suggests that subject evaluations were more influenced by the accomplice than by each other in terms of the subsequent effects on attitudes. The transformations required to stabilize the accuracy and congruency variances relative to the other vice president were of a square root form while those for the same variables relative to the president were of a logarithmic form. These

results suggest that subordinates reacted much more quickly to the president than to each other over the three experimental treatment conditions.

The implication of these results is that the accomplice was effective in directing the participative budgeting process and the influence that resulted was to be expected. This interpretation is consistent with Maier's argument that regardless of problem solving ability, a leader tends to exert a major influence on the outcome of a discussion.<sup>3</sup> This implication is also consistent with the Becker and Green position that management should direct the participation process.

#### Viability of the Communication Process Approach

Taken together, the experimental results demonstrate the viability of a communication process approach to the study of participative budgeting. The experiment, while only a limited test of the model, generated evidence supporting the hypothesized linkage between subordinate analysis of the content of the budgeting process and more favorable attitudes toward the budget. Importantly, no fundamental flaws in the operation of the model and its related measurement approach were exposed by this initial test. Thus, subsequent uses of the approach are recommended as extensions of this research. However, the limitations of the present study are first discussed below.

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<sup>3</sup>Norman R. F. Maier, "Assesses and Liabilities in Group Problem Solving: The Need for an Integrative Function," Psychological Review LXXIV, no. 4 (1967): p. 241.

### Limitations

The limitations of this study concern three major areas: the generalizability of the findings; the focus on the effects of the communication process; and the test instruments used in the measurement of the content analysis variables.

### Generalizability

A major limitation is the lack of generalizability of the experimental findings to real world settings. Many of the aspects of this limitation, discussed below, were occasioned by the need to establish a high degree of internal validity in the experimental design. Otherwise, an unambiguous linkage of the significant differences in the response variables found in the experiment to the treatment of participation could not have been made.

The experimental subjects were students as surrogates for subordinate manager roles. While these individuals were close to graduating and assuming managerial type positions in organizations, there is little reason to expect that their behavior in a laboratory setting would be similar to that of real world managers.<sup>4</sup> Future replications of this research could utilize managers in a laboratory in a real world setting to permit more generalized findings of the results.

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<sup>4</sup>For a discussion of the general problem of surrogation, see John W. Dickhaut, John L. Livingstone, and David J. H. Watson, "On the Use of Surrogates in Behavioral Experimentation," Report of the Committee on Research Methodology in Accounting, supplement to volume XLVVV of the Accounting Review (1962): pp. 455-471.



The same budgeting information packet provided to all participants as the experimental baseline is not representative of most real world situations, where budgeting information available to each individual is likely to be quite different. Subsequent laboratory replications of this study may vary both the amount and type of information available to participants to better represent real world settings. Field tests of the model may attempt to capture the actual budgeting information available as part of the analysis.

The budgeting situation was fairly well-defined to facilitate the completion of the experiment within the allotted two hour time frame as well as to minimize the variability of the decisions made as noted above. Real world situations are likely to be considerably less structured. Thus, future replications may vary the complexity of the situation as well as the time involved to better represent real world situations.

The experimental budgeting activity was limited to a one-time planning exercise within the budget cycle, with only historical data provided as information about previous years. A real world participative budgeting process is likely to involve individuals who were directly affected by the previous results and who will be affected by the budget developed. Thus subsequent research may expand the model to incorporate the control function and feedback process to investigate the participative budgeting model in longitudinal studies. Suggested expansions are discussed as part of the extensions of this research later.

### Communication Effects

The analysis of the interactive communication activity in the experiment focused on certain effects and assumed that the unobserved activity comprising the operation of the process was constant across laboratory sessions. This assumption was a primary underlying reason for the use of the same accomplice in all sessions. The major limitation imposed by this assumption is that confounding variables may have arisen within the communication activity to effect the results. The probability of this occurrence is not considered great, however,

The major practical reason for focusing on the effects of the communication was that the methodology required to analyze communication activity itself was considered beyond the scope of this study. However subsequent research may undertake such an analysis using the appropriate methodology from the communications field.<sup>5</sup>

### Test Instruments

The test instruments used to measure the variables related to subordinate analysis of the content were developed and pretested as part of this research. However, the experiment was the first operational use of the instruments and consequently their validity is limited. As the instruments were based directly on the information provided participants in the experiment, logically the instruments appeared to measure what they were designed to measure, on their face.

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<sup>5</sup>The nature of this activity is discussed by Bales and Strodtbeck in "Phases in Group Problem Solving," pp. 488-489.

However, this face validity needs reinforcement by subsequent research to establish the construct validity of the instruments. That is, it must be determined that participants really do understand the budgeting situation, accurately perceive the other participants, are congruent with them, and in agreement with the final budget.<sup>6</sup>

The experimental results suggest the most serious construct validity problem relates to the understanding measure. The general lack of any significant relationships between understanding and the other content analysis variables imply that the understanding measure may have been inappropriate to assess subordinate understanding.

#### Extensions of the Research

The results of this study are considered primarily useful as a basis for further research in three major areas beyond the replications suggested above to permit the generalizability of findings from the use of the model to real world settings. These areas concern the elaboration of the participative budgeting model, other applications of the coorientation model in accounting research and aspects of the budget decision that result from the participative budgeting process.

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<sup>6</sup>The validity aspects discussed here are drawn from the discussion by Stephen Issac and William B. Micheal, Handbook in Research and Evaluation (San Diego: Edits Publishers, 1975), pp. 82-83.

### Elaboration of the Participative Budgeting Model

The elaboration of the model developed in this research may occur in two directions. First, participant information processing models assumed to exist and operate within the participative budgeting model may be explicitly investigated in subsequent research. For example, the methodology of the Brunswick Lens model may be incorporated in the orientation phase to assess the degree of similarity of perceiving the facts of the budgeting situation between participants in a more rigorous manner.<sup>7</sup> Also, participant preference functions and decision models may be incorporated in the evaluation and decision making phases respectively to provide additional insights concerning the effects of interactive communication as participation in the budgeting process.

The second direction to elaborate the model may involve its expansion to incorporate the activities of the control function in the budget cycle. An initial extension in this direction may be to incorporate a behavioral intention model to allow the assessment of whether and how the more favorable attitudes toward the budget relate to aspiration levels and motivation of subordinates to achieve the budget.<sup>8</sup> Then these results may be extended into the analysis of

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<sup>7</sup>An example of how such an approach might be undertaken is provided by William F. Wright in "Financial Information Processing Models: An Empirical Study," The Accounting Review LII, no. 3 (1977): pp. 676-689.

<sup>8</sup>Such a model is developed at length by Martin Fishbein and Icek Ajzen in Belief, Attitude, Intention, and Behavior (Reading, Mass: Addison-Wesley Publishing Co.; 1975), pp. 298-308.

subsequent budget related behavior in the control function.

#### Uses of the Coorientation Model

Other uses of the coorientation concept and measurement model may be possible in both budgeting-related and other accounting research. An immediate extension of this study may be the investigation of whether increased cohesiveness results from participation in the budgeting process and whether it interacts with the attitudes toward the budget. Such a study may construct the appropriate matchings between components of participant attitudes toward each other as well as toward the budget and then use the measurement model.

Another budgeting related use of the coorientation model may be the investigation of the budgetary slack issue.<sup>9</sup> Such a study may investigate the direction of the differences in the various matchings of participant actual and estimated evaluations as a possible means to determine whether slack is actually built into, or thought to be built into, budget recommendations.

The use of the coorientation model may be appropriate in other areas of accounting research that concern comparisons of judgements between individuals. For example, research concerning auditor judgement of internal control situations may find the coorientation model useful to determine whether auditors who report different evaluations concerning an internal control situation are cooriented to the facts of that situation. If not, the variation in judgement may be found

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<sup>9</sup>The budget slack issue is discussed by Michael Schiff and Arie Y. Lewin in "The Impact of People on Budgets," Accounting Review XLV, no. 2(1970): pp. 259-268.



attributable to the lack of coorientation.

#### Aspects of Budget Decisions

The present study was concerned with the attitudes toward the budget as an indication of subordinate acceptance of the budget decision. Subsequent research may seek other or refined measures of subordinate acceptance. As a related extension, future studies may investigate the effects of the participative budgeting process on the quality of the budget decision. One approach to investigation of decision quality may be to test the Vroom and Yetton normative model, which deals with both decision quality and acceptance, in a participative budgeting setting.<sup>10</sup>

In conclusion, Swieringa and Moncur state:

Even though the objective of budgeting is to influence managerial behavior - . . . - our present knowledge of the mechanism through which or by which budgeting influences that behavior is at best incomplete.<sup>11</sup>

This study is considered to have taken the first step toward providing this knowledge.

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<sup>10</sup>This model is based on the decision styles taxonomy incorporated in the model of this study. See Vroom and Yetton, Leadership and Decision Making, for the model development and prescription for its use.

<sup>11</sup>Swieringa and Moncur, Some Effects of Participative Budgeting on Managerial Behavior, p. 13.

## APPENDIX

This appendix provides the materials and instruments of the experiment. The four packets are arranged in the sequence utilized in the laboratory session. The variations of each packet across the four conditions follow the basic packet and are identified as to their specific conditions.

Packet A was provided to all participants in the format shown on pages 181 through 192.

Packet B was used to provide subjects the procedures appropriate to their assigned experimental condition. The packet shown here is the type provided a subject assigned the position of vice president for production, as chapter four outlined the typical vice president for sales position. The packet for condition 1 is shown on pages 193 through 196; the condition 2 variations, pages 197-8; condition 3 variations, pages 199-200; and condition 4 variations, pages 201-202.

Packet C was used to record subject responses concerning the facts of the budgeting situation and actual and estimated evaluations concerning the budgeting situation held by participants. The packet for conditions 1 through 3 is shown on pages 203-10; the condition 4 variation is shown on pages 211-213.

Packet D was utilized to record subject responses concerning dependent measures and other data. The condition 1 packet is shown on pages 214-217; the condition 2 and 3 packet included page 218 but did not include page 214; and the packet in condition 4 included page 219 instead of pages 214-216.

## INTRODUCTION

Thank you for taking the time to participate in this session today. You are about to become involved in a laboratory session in which you and the other participants will assume the roles of business executives making decisions. The session has been designed to simulate in many ways an organization environment that you may experience when employed as a manager in an organization. Similarly, the decisions that will be made are similar in many ways to those you will find made in actual business practice. The decisions involve the allocation of funds within the organization and a pricing strategy in a highly competitive market.

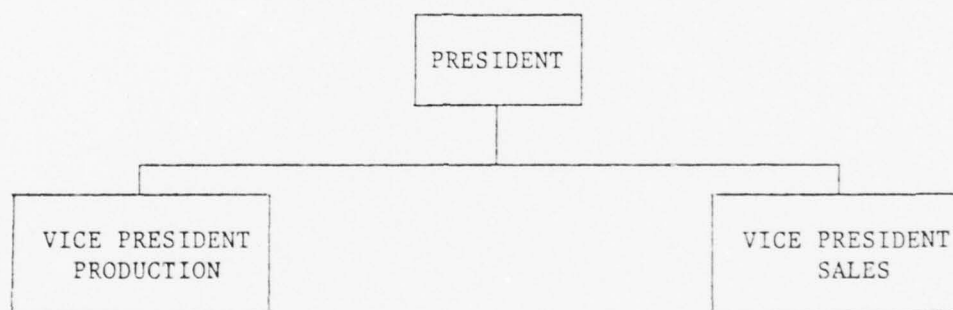
One of the major aims of this project is to determine the usefulness of certain information in decision-making. The purpose of this packet is to provide you with the information along with a brief explanation of the organizational setting simulated in the session. Thus, we would like you to take the next thirty minutes to read through the following pages. After you have read this packet, you will receive another packet which specifies the exact role we would like you to take during the remainder of the session.

Thank you again for taking part in this session.

## ORGANIZATION SETTING

This session utilizes a simplified economy with three industries. Within each of these industries, three companies compete for their share of the market within the industry; each company sells the same basic product. To make this session one involving general business principles, the product is not specifically defined. The decisions which must be made are thus based on general business principles rather than on specific knowledge concerning the production and distribution of a particular product, or specific knowledge of particular accounting and financial procedures.

Your company is firm 2 in a particular industry in this economy, and is organized as follows:



You will soon be asked to assume one of these roles, and the specific responsibilities of your position will be detailed at that time. Again, your company is one of three firms operating in a highly competitive industry.

As the above organization chart might suggest, many simplifications have been made here to reduce a real-life business situation to one which can be handled during this session. One major simplification is the requirement that the firm's operations in the market be financed entirely from cash on hand. This is admittedly unrealistic and results in a much larger amount of cash, compared with total assets, than a firm would have on hand in real life. Similarly, some of the usual percentage figures typically used for analyzing the financial statements obviously will not be usable here. However, it has been found that participants adjust quickly to the specific frame of reference used in this laboratory session, and the experience becomes a surprisingly interesting one because of the realistic business factors included. As this description progresses you will acquire more knowledge of the firm and your competition in the industry.

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NAVAL POSTGRADUATE SCHOOL MONTEREY CA  
PARTICIPATIVE BUDGETING AS A COMMUNICATION PROCESS: A MODEL AND--ETC(U)  
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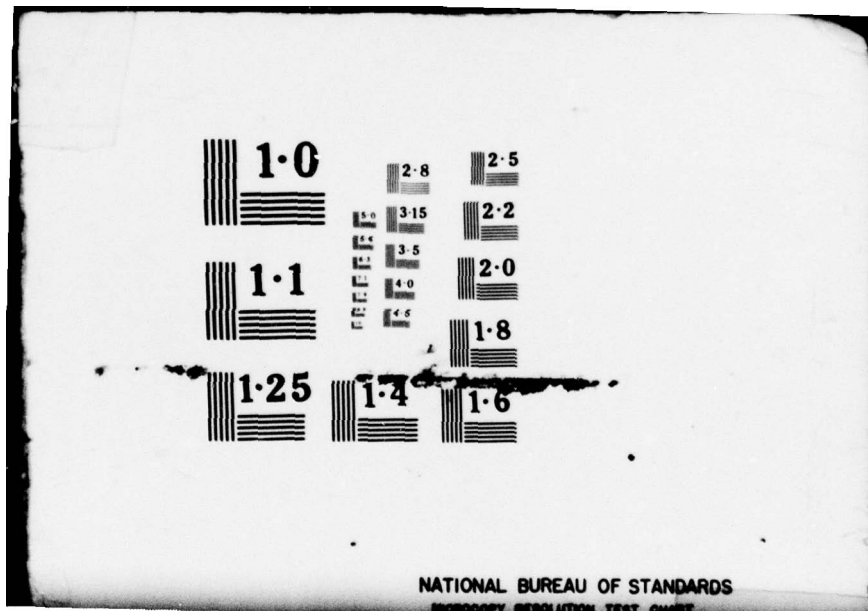
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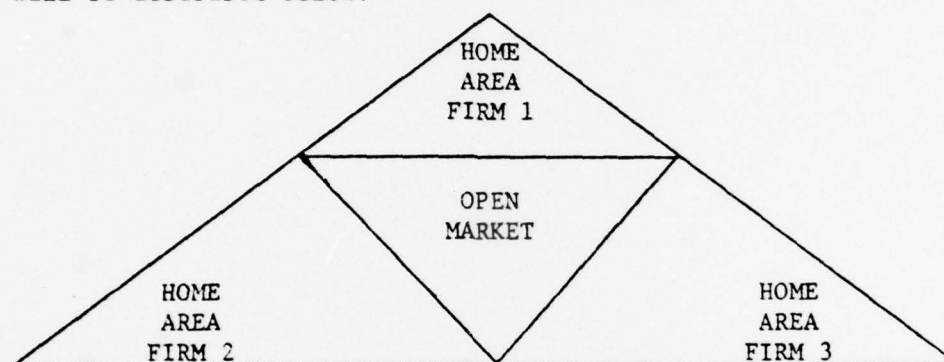






## GEOGRAPHICAL BREAKDOWN OF THE INDUSTRY MARKET

The industry market is geographically divided into four areas as shown below and any firm in the industry may sell its product in any area of this market. Area 1 is the home area of firm 1, area 2 is the home area of firm 2 (your firm), and area 3 is the home area of firm 3; area 4 is an open market. Each firm has an advantage in its own area, in that you will find later there are no transportation charges for the firm on any units sold in its home area. Such charges are applied to units sold in competitors' areas and in the open market area, area 4. The amount of the transportation charges will be described below.



## REPORTS AVAILABLE

You will soon be provided reports showing the economic condition of your company and the industry at the present time. There are two kinds of reports: industry reports and confidential reports. The industry report contains information of the type usually published by firms and is available to the entire industry. Each firm's industry report is identical. The confidential report contains the kind of internal documents that usually would be available to managers making the type of decisions your firm will be faced with during the session. Some of the information in this report may not be generally available to the public, and each firm's report applied only to its own firm's operations. Both reports will be described in detail later.

## DECISIONS TO BE MADE

AREA DECISIONS. After analyzing the reports, your firm will make a set of decision. The first set consists of the area decisions. For each marketing area, it must decide the unit selling price and the amount of money to be spent on marketing. The firm is free to set any area price it desires and to spend any part of its available cash for marketing in any area. The amount of money spent on marketing covers advertising, sales salaries, commissions, and other items associated with the company's marketing effort.

The potential industry market in each area is a function of product price, market research, and the total marketing expenditure in the area. Thus, the potential market and each firm's share of that market depend on the funds spent on these activities. Since this is a competitive situation, the relation of marketing dollars and research dollars (to be discussed shortly) of one company to the other two in the industry is quite important for each area.

Also, the demand in the industry may vary up and down with the business index as is likely to occur in normal periods of growth or recession.

PLANT DECISIONS. Your firm must also decide how much money to spend on plant improvement or expansion, production, and research.

Plant and equipment manufacturing capacity may be increased at a cost of \$20,000 for each 1,000 units of product. The increased capacity becomes available at the end of the year in which the expenditure is made. Overall plant capacity depreciates at a fixed rate of 2% per year. The effect of the depreciation occurs at the end of the year. Plant capacity can be calculated by dividing the plant cost by \$20. For simplicity, both plant and equipment have been lumped together. To maintain plant capacity at a given level from year to year, cash equal to depreciation must be allocated to plant improvement.

Production expenditures cover materials, labor, and the indirect, or overhead, costs of producing the units each year. To simplify the situation, plant depreciation is not considered part of the overhead costs of production. Thus, all overhead costs are cash costs in your firm. Because of the nature of the production process, it is necessary to produce units in lot sizes of 1,000 units.

Research expenditures may have a positive effect on the potential market by improving the desirability of your product. These expenditures may also result in decreases in production costs by discovery of new technology or improved processes. Thus, research expenditures are made to affect both marketing and production favorably.

## INFORMATION AVAILABLE

This section presents the information available to your firm which will provide the basis for the decisions to be made shortly. The information is presented as a five year summary of industry and confidential reports.

You will probably find it quite easy to deal with most of the information presented in the reports, as the financial statements are primarily cash based. However, if you encounter any difficulty with any of the items as you read through the reports, you may utilize a glossary of terms provided at the end of the reports. The terms are arranged in the same order in which they appear in the reports. Your firm, firm 2, is highlighted in the industry report. Please take a few minutes to carefully look over these reports, since they will serve as the basis for the decisions which will be made very shortly.

You will receive your specific role assignment after you have looked over the reports provided on the following pages. As you read these reports, the years should be read from left to right; that is, year 5 is the most recent year.

**INDUSTRY REPORT  
FIVE YEAR SUMMARY  
(000's OMITTED)**

YEAR	1	2	3	4	5
BUSINESS INDEX	1.01	1.01	1.01	.98	.95
BALANCE SHEETS					
FIRM 1					
CASH	10349	10392	11023	11384	10059
INVENTORY	0	0	0	0	1622
PLANT INVESTMENT	5240	5559	5653	5751	6149
TOTAL ASSETS	15589	15951	16676	17135	17829
FIRM 2					
CASH	9153	10169	11484	6214	10957
INVENTORY	1312	707	0	4514	0
PLANT INVESTMENT	5220	5240	5359	6412	6283
TOTAL ASSETS	15684	16116	16843	17140	17240
FIRM 3					
CASH	10215	10606	10045	12004	11658
INVENTORY	0	0	1599	0	1
PLANT INVESTMENT	5320	5320	5213	5109	5907
TOTAL ASSETS	15535	15925	16857	17112	17564
TOTAL MARKET SURVEY					
TOTAL ORDERS	795	829	829	914	904
TOTAL SALES	765	779	777	664	756
TOTAL MARKETING EXPENDITURES	\$ 1973	\$ 2360	\$ 2756	\$ 2860	\$ 3000
AREA ANALYSIS					
AREA 1					
ORDERS	147	152	151	166	167
SALES	141	134	132	128	146
MARKETING	\$ 280	\$ 360	\$ 415	\$ 390	\$ 450
PRICES					
FIRM 1	\$40.00	\$42.00	\$44.00	\$43.00	\$46.00
FIRM 2	\$40.00	\$41.00	\$44.00	\$46.00	\$41.00
FIRM 3	\$39.00	\$46.00	\$54.00	\$42.00	\$45.00
AREA 2					
ORDERS	156	161	164	183	178
SALES	154	158	157	143	153
MARKETING	\$ 432	\$ 450	\$ 601	\$ 695	\$ 775
PRICES					
FIRM 1	\$39.00	\$39.00	\$41.00	\$40.00	\$42.00
FIRM 2	\$42.00	\$31.00	\$44.00	\$30.00	\$43.00
FIRM 3	\$39.00	\$50.00	\$52.00	\$41.00	\$42.00
AREA 3					
ORDERS	153	159	157	170	170
SALES	145	150	153	106	122
MARKETING	\$ 360	\$ 425	\$ 470	\$ 410	\$ 475
PRICES					
FIRM 1	\$39.00	\$39.00	\$41.00	\$40.00	\$42.00
FIRM 2	\$40.00	\$41.00	\$44.00	\$46.00	\$41.00
FIRM 3	\$41.00	\$42.00	\$50.00	\$45.00	\$47.00
AREA 4					
ORDERS	339	357	357	395	309
SALES	325	337	335	287	335
MARKETING	\$ 901	\$1125	\$1270	\$1365	\$1300
PRICES					
FIRM 1	\$40.00	\$42.00	\$43.00	\$43.00	\$46.00
FIRM 2	\$42.00	\$41.00	\$44.00	\$46.00	\$41.00
FIRM 3	\$39.00	\$41.00	\$51.00	\$44.00	\$46.00



**CONFIDENTIAL REPORT  
FIVE YEAR SUMMARY  
(000's OMITTED)**

YEAR	1	2	3	4	5
<b>AREA SALES ANALYSIS</b>					
<b>AREA 1</b>					
ORDERS	14	10	2	2	2
SALES	14	10	2	2	2
PRICE CHARGED	\$40.00	\$41.00	\$44.00	\$46.00	\$41.00
UNIT DELIVERED COST	36.49	36.97	36.51	36.17	40.01
SALES REVENUE	556	419	98	86	76
MARKETING	10	10	0	10	0
TRANSPORTATION	28	20	4	4	4
<b>AREA 2 (HOME AREA)</b>					
ORDERS	114	132	138	63	101
SALES	114	132	133	63	99
PRICE	\$42.00	\$43.00	\$44.00	\$50.00	\$43.00
UNIT DELIVERED COST	34.49	34.97	34.51	34.17	38.01
SALES REVENUE	4768	5684	5872	3164	4270
MARKETING	352	400	425	565	400
TRANSPORTATION	0	0	0	0	0
<b>AREA 3</b>					
ORDERS	14	8	3	2	2
SALES	14	8	3	2	2
PRICE	\$40.00	\$41.00	\$44.00	\$46.00	\$41.00
UNIT DELIVERED COST	36.49	36.97	36.51	36.17	40.01
SALES REVENUE	550	347	121	94	96
MARKETING	10	10	0	10	0
TRANSPORTATION	28	17	6	4	5
<b>AREA 4</b>					
ORDERS	89	100	147	65	161
SALES	89	100	143	65	158
PRICE	\$42.00	\$43.00	\$44.00	\$50.00	\$43.00
UNIT DELIVERED COST	35.49	35.97	35.51	35.17	39.01
SALES REVENUE	3749	4297	6271	3239	6780
MARKETING	301	350	425	565	400
TRANSPORTATION	89	100	143	65	158
<b>PRODUCTION REPORT</b>					
<b>ON HAND INVENTORY (YEAR END)</b>					
UNITS	38	20	0	132	0
UNIT COST	\$34.45	\$35.06	\$34.47	\$34.17	\$41.95
DOLLAR VALUE	\$ 1312	\$ 707	\$ 0	\$ 4514	\$ 0
<b>PLANT CAPACITY</b>					
UNITS	260	261	262	268	321
UNIT COST	\$34.44	\$34.44	\$34.44	\$34.10	\$34.44
PRODUCTION COST	\$ 8955	\$ 8990	\$ 9023	\$ 9135	\$11041
<b>CURRENT PRODUCTION</b>					
UNITS	260	233	261	264	129
UNIT COST	\$34.45	\$35.06	\$34.47	\$34.17	\$41.95
PRODUCTION COST	\$ 8955	\$ 8158	\$ 8990	\$ 9023	\$ 5413
<b>10% LESS PRODUCTION</b>					
UNITS	234	209	235	238	116
UNIT COST	\$35.01	\$35.69	\$35.03	\$34.74	\$43.34
PRODUCTION COST	\$ 8190	\$ 7473	\$ 8222	\$ 8256	\$ 5033
<b>10% MORE PRODUCTION</b>					
UNITS	286	256	287	290	142
UNIT COST	\$33.98	\$34.54	\$34.00	\$33.70	\$40.80
PRODUCTION COST	\$ 9718	\$ 8841	\$ 9755	\$ 9790	\$ 5792

CONFIDENTIAL REPORT  
FIVE YEAR SUMMARY  
(000's OMITTED)

YEAR	1	2	3	4	5
<b>PROFIT &amp; LOSS</b>					
REVENUES	\$ 9623	\$10737	\$12363	\$ 6583	\$11221
COST OF UNITS SOLD	7948	8762	9697	4509	9928
TRANSPORTATION	145	137	153	73	166
MARKETING	673	770	850	1150	800
RESEARCH	100	100	104	150	0
DEPRECIATION	104	104	105	107	128
TOTAL EXPENSES	<u>8969</u>	<u>9873</u>	<u>10908</u>	<u>5989</u>	<u>11072</u>
PROFIT BEFORE TAXES	654	864	1454	594	199
TAXES	327	432	727	297	100
NET PROFIT	<u>327</u>	<u>432</u>	<u>727</u>	<u>297</u>	<u>100</u>
<b>CASH STATEMENT</b>					
OLD BALANCE	\$ 9853	\$ 9153	\$10169	\$11484	\$ 6214
ADD: REVENUES	9623	10737	12363	6583	11221
DEDUCT: PRODUCTION	8955	8158	8990	9023	5413
TRANSPORTATION	145	137	153	73	166
MARKETING	673	270	850	1150	800
RESEARCH	100	100	104	150	0
PLANT IMP.	124	124	224	1160	0
TAXES	327	432	727	297	100
NEW BALANCE	<u>\$ 9153</u>	<u>\$10169</u>	<u>\$11484</u>	<u>\$ 6214</u>	<u>\$10957</u>
<b>BALANCE SHEET ASSETS</b>					
CASH	\$ 9153	\$10169	\$11484	\$ 6214	\$10957
INVENTORY	1312	707	0	4514	0
PLANT:	5220	5240	5359	6412	6283
OLD PLANT	5200	5220	5240	5359	6412
ADD IMPROVEMENT	124	124	224	1160	0
DEDUCT DEPRECIATION	<u>(104)</u>	<u>(104)</u>	<u>(105)</u>	<u>(107)</u>	<u>(128)</u>
TOTAL ASSETS	<u>\$15684</u>	<u>\$16116</u>	<u>\$16843</u>	<u>\$17140</u>	<u>\$17240</u>

## GLOSSARY

NOTE: While analyzing the reports, please bear in mind that most figures are shown in even thousands of dollars and there may be some slight discrepancies in the results due to rounding.

## INDUSTRY REPORT

Business Index. An indication of the overall trend of the economy. If it changes in a positive direction, the economy is expanding, and the number of potential orders will increase. If it changes in a negative direction, the economy is contracting, and the number of potential orders will decrease.

Balance Sheet

Cash. The total amount of money on hand at the end of the year.

Inventory. The total value of the units remaining on hand at the end of the year. The value of this inventory depends on the cost of producing the units included in it.

Plant Investment. The value of the firm's plant at the end of the year. The value of the plant depreciates at the rate of 2% per year in this industry.

Total Assets. The sum of cash, inventory and plant investment.

Total Market Survey

Total Orders. The total of all orders received by all firms doing business in each area.

Total Sales. The total of all orders filled in each area. If there are fewer sales than orders in any area, some firm or firms are not producing enough to fill the orders.

Total Marketing. The total amount of money spent in the area indicated by all the firms doing business in that area.

Area Analysis. Orders, sales, and marketing expenditures by area indicated as totals for the firms doing business in that area. Also unit prices are separately stated as charged by each firm.

Firm Sale Prices. The unit price charged by each firm for each area in which it does business.

## CONFIDENTIAL REPORT

### Area Sales Analysis

Orders. The total number of orders received by your firm in the areas indicated during the periods covered by the report.

Sales. The total number of units sold by your firm in the areas indicated for the period covered. If this figure is less than orders, your firm is underproducing and/or pricing too low.

Unit prices. The decisions that your firm made in the previous year.

Unit delivered cost. The unit cost of production plus the cost of transporting the units to the areas in which they were sold.

Sales Revenue. The total amount of money your firm received for the sales it had in each of the areas indicated.

Marketing. The total amount your firm decided to spend on marketing in each area during the previous period.

Transportation. The total cost of transporting units sold. The cost of transporting units sold is as follows: units sold in your home area incur no transportation costs; units sold in area 4 incur a charge of \$1.00 per unit sold. Units sold in competitor areas incur a charge of \$2.00 per unit.

### Production Report

Inventory. The quantity, unit cost, and total value of unsold units at the end of the year. In the next year, these units are sold first.

Plant Capacity. The quantity of units your plant could produce at full capacity, the unit cost at capacity, and the total cost of full capacity production. To increase plant capacity you must invest in plant improvement. To determine plant capacity for any year, divide the plant value by \$20.

Current Production. The quantity of units produced during the year indicated, their unit cost, and their total value.

10\$ Less. The same data as current production at a level of 10% fewer units.

10% More. The same data as current production at a level of 10% more units, up to plant capacity.



### Profit and Loss

Revenue. The total amount of cash received from the sale of units each year.

Cost of Units Sold. The production cost of the units sold. The cost of unsold units appears as inventory in the balance sheet.

Transportation. The cost of transporting units sold. This charge is \$1.00 per unit to area 4, and \$2.00 per unit to competitor areas.

Marketing. The amount your firm decided to spend on marketing each year.

Research. The amount your firm decided to spend on research each year.

Depreciation. An expense computed at the rate of 2% of plant each year.

Total Expense. Total costs of operation each year.

Profit Before Taxes. Revenue minus total expense.

Taxes. 50% of the profit before taxes.

Net Profit. Profit before taxes minus taxes.

### Cash Statement

Old Balance. The amount of cash at the beginning of each year.

Revenue. Total cash received from the sale of units each year.

Production Cost. Total cost of production incurred each year. This figure includes the cost of producing the unsold units in inventory.

Transportation. The cost of transporting units actually sold each year.

Marketing. The amount spent on marketing each year.

Research. The amount spent on research each year.

Plant Improvement. The amount spent to maintain or expand plant capacity each year.

Taxes. The amount of taxes paid each year.



New Balance. The amount of cash your firm has to conduct business for the next year. This balance cannot be negative; that is, the firm cannot borrow money.

Balance Sheet. Individual items are defined in the industry report section of the glossary.

## SPECIAL CHARACTERISTICS OF YOUR FIRM

You are now the newly employed Vice President for Production. Recall that the organization chart of your firm, provided earlier, defines your position as reporting directly to the president.

The company's production facilities are located in area 2, your home area. The company headquarters and main sales offices are located in area 4 of the geographical market, but in different cities. Thus, the vice president for sales and the president of the company are in different cities, and the vice president for production is in a different area. Because of the physical separation of the personnel in your firm, the following procedures have been established for making the area and plant decisions.

First, the president and each vice president receive copies of the reports available. (Your copy of the reports is provided in Packet A.) All personnel receive the same information in these reports. Each individual conducts a thorough analysis of the information in these reports on his own, as each person is in a different location.

After completing the analysis, each vice president makes recommendations to the president concerning the area decisions and the plant decisions required for the coming year. These recommendations are forwarded to the president by the use of a standard budget form. (The form is located at the end of the packet.) This standard form has proven very useful in the past as an accurate means to forward recommendations to the president. The possibility of errors is greatly reduced since the same format is utilized by all personnel.

## YOUR ROLE

As the Vice President for Production, your primary responsibility is to minimize the production costs per unit in both the short run and over the long run. The president has established the overall company goal as the maximizing of profits, and is very concerned with the performance of the Production Division. For example, the unit production cost in year 5 was almost as high as the unit price charged in two areas, and was higher than the unit price charged in the other two areas. This situation is causing severe profitability problems for the company.

Given this situation, your analysis should be directed toward determining the cash needed for each of the plant decisions to bring about a turnaround in production cost per unit. At the same time you should ensure that the production operations and decisions are consistent with the requirements of the Sales Division. The Sales Division is expected to maximize sales revenue and increase the firm's market

share of the industry. Since the Vice President for Sales is in another location, it is not possible to communicate directly. However, recall that both of you have exactly the same information in your reports.

To meet your responsibilities, you should now take the following steps in the order given.

First, determine the cash required to significantly reduce the unit production cost. At the same time, be sure to consider the implications of your production plans on the sales effort. While making these determinations, you may refer back to the reports provided in Packet A as often and as much as you wish. You may take up to forty-five minutes to make these determinations.

Secondly, after you decide how much cash you need, take out the budget form located at the back of this packet. The form is in duplicate and contains a glossary of brief descriptions of the effects of each decision that you should expect. Completely fill out the budget form. That is, you should indicate what you think (1) the unit price charged in each area should be, and (2) the appropriate amount of cash for marketing in each area and each plant decision should be. The last balance sheet available (year 5) indicates that your firm has \$10,957 for operations in the coming year. Your cash allocations to the various decisions requiring cash must not exceed this amount. Also, note the budget form *does* have a comments section. You may utilize this section to provide any additional recommendations you feel the president should receive.

Thirdly, after you have completely filled out the budget form, submit the form to the president. (This is accomplished by giving the form to the session administrator, who will take the form to the president.) Retain the duplicate of the budget form as you will need the form for later use. Also, hand in Packet A at this time to the session administrator. After turning in the budget form (original) and Packet A you will receive Packet C as a replacement for Packet A. Upon receipt of Packet C, please open the packet and follow the instructions given inside the packet.

## FIRM 2

## BUDGET RECOMMENDATION FORM

## AREA DECISIONS

UNIT PRICES      AREA 1 \$ \_\_\_\_\_ (Unit prices in whole dollar amounts)

AREA 2 \$ \_\_\_\_\_

AREA 3 \$ \_\_\_\_\_

AREA 4 \$

## MARKETING EXPENDITURES

AREA 1 \$

AREA 2 \$

AREA 3 \$

AREA 4 \$

A. TOTAL MARKETING \$

## PLANT DECISIONS

B. PRODUCTION EXPENDITURES \$

C. PLANT IMPROVEMENT \$

D. RESEARCH \$ \_\_\_\_\_

TOTAL EXPENDITURES  
(A thru D) \$

TOTAL CASH AVAILABLE	\$10,957
----------------------	----------

COMMENTS AND ADDITIONAL RECOMMENDATIONS

(SIGNATURE)



## GLOSSARY

## AREA DECISIONS

Unit Price. The price per unit to be charged in an area. Unit prices in each area are competitive. If your firm's prices are too high, you may not sell many units. If it is too low, your firm may have more orders than it can fill. The number of orders in an area is influenced by the marketing expenditures in that area and by the overall level of research conducted by your firm.

Marketing. The amount to be expended on the company's sales effort. Too little marketing will result in no orders. Too much marketing may result in more orders than can be filled. The firm's marketing effort must be competitive in each area to obtain orders.

## PLANT DECISIONS

Plant Improvement. Expenditures to counteract depreciation and possibly expand plant capacity. Expenditures result in a cash outlay, but due to construction lead time, the increased capacity is not available for a year.

Production. Expenditures to produce the product. Amounts required to achieve various levels of production are shown in the production reports.

Research. Expenditures for research and development. These expenditures should have a long range effect on both the desirability of your product and the cost of producing the product. The research effort must be competitive.



## SPECIAL CHARACTERISTICS OF YOUR FIRM

You are now the newly employed Vice President for Production. Recall that the organization chart of your firm, provided earlier, defines your position as reporting directly to the president.

All of the company's facilities are located in area 2, your home area. The following procedures have been established in your firm as an aid to making the plant and area decisions.

First, the president and each vice president receive copies of the reports available. (Your copy is provided in Packet A.) All personnel receive the same information in these reports. Each individual initially conducts a thorough analysis of the information in these reports. Based on this analysis, each individual may determine facts that may be important for the decisions to be made.

Secondly, a meeting of all personnel is held. This meeting has proven very useful in the past as a means to ensure that everyone knows what the facts are in the situation facing the firm.

Thirdly, after the meeting, each vice president makes recommendations to the president concerning the area and plant decisions required for the coming year. These recommendations are forwarded to the president by the use of a standard budget form (located at the end of this packet). This standard form has proven very useful as an accurate means to forward recommendations to the president. The possibility of errors is reduced greatly since the same format is used by all personnel.

## YOUR ROLE

As the Vice President for Production, your primary responsibility is to minimize the production costs per unit in both the short run and over the long run. The president has established the overall company goal as the maximizing of profits, and is very concerned with the performance of the Production Division. For example, the unit production cost in year 5 was almost as high as the unit price charged in two areas, and was higher than the unit price charged in the other two areas. This situation is causing severe profitability problems for the company.

Given this situation, your analysis should be directed toward determining the cash needed for each of the plant decisions to bring about a turnaround in production cost per unit. At the same time you should ensure that the production operations and decisions are consistent with the requirements of the Sales Division. The Sales Division is expected to maximize sales revenue and increase the firm's market share of the industry.

To meet your responsibilities, you should now take the following steps in the order given.

First, you should ensure that you have analyzed the reports thoroughly enough to know the nature of the situation facing the firm. You may have already accomplished this as you read through Packet A. If not, you may take up to fifteen more minutes to analyze the reports in Packet A.

Secondly, the president will convene a meeting with the vice presidents after your analysis is completed. The purpose of the meeting each period is to ensure that everyone knows what the facts of the situation facing the firm are. Thus, you provide the president and the other vice president with the facts you have determined from your analysis of the reports. In turn, you are likely to receive some new facts from the other persons at the meeting. This meeting will take about thirty minutes.

Thirdly, after the president adjourns the meeting, you return to your division. There you determine the cash that is needed to significantly reduce the unit production cost. At the same time, be sure to consider the implications of your production plans on the sales effort. While making these determinations, you may refer back to the reports in Packet A as much and as often as you wish. You may take up to fifteen minutes to make these determinations.

Fourthly, take out the budget form located at the back of this packet. The form is in duplicate and contains a glossary of brief descriptions of the effects of each decision. Completely fill out the budget form. That is, you should indicate what you think (1) the unit price charged in each area should be, and (2) the appropriate amount of cash for marketing in each area and each plant decision should be. Your cash allocations to the various functions may not exceed the \$10,957 available cash balance as of the end of year 5. Also, note the budget form does have a comments section. You may utilize this section for any additional recommendations you feel the president should receive.

Finally, submit the completely filled out form to the president. Sign the form as "VP - Production." Retain the duplicate of the budget form. Also, hand in Packet A at this time to the president. Upon turning in your budget form and Packet A, you will receive Packet C as a replacement for Packet A. Upon receipt of Packet C, please open the packet and follow the instructions given inside the packet.

## SPECIAL CHARACTERISTICS OF YOUR FIRM

You are now the newly employed Vice President for Production. Recall that the organization chart of your firm, provided earlier, defines your position as reporting directly to the president.

All of the company's facilities are located in area 2, your home area. The following procedures have been established in your firm as an aid to making the area and plant decisions.

First, the president and each vice president receive copies of the reports available. (Your copy is provided in Packet A.) All personnel receive the same information in these reports. Each individual initially conducts a thorough analysis of the information in these reports. Based on this analysis, each individual may determine facts that may be important for the decisions to be made and may think of alternatives that may be helpful in making the decisions for the upcoming year.

Secondly, a meeting of all personnel is held. This meeting has proven very useful in the past as a means to accomplish the following: ensuring everyone knows what the facts are in the situation facing the firm; allowing the exchange of ideas, suggestions, and alternatives among individuals concerning the decisions to be made; and reaching a consensus on the decisions to be made among the individuals at the meeting. At the conclusion of the meeting, the budget form (located at the end of this packet) is jointly filled out by the president and the vice presidents.

## YOUR ROLE

As the Vice President for Production, your primary responsibility is to minimize the production costs per unit in both the short run and over the long run. The president has established the overall company goal as the maximizing of profits, and is very concerned with the performance of the Production Division. For example, the unit production cost in year 5 was almost as high as the unit price charged in two areas, and was higher than the unit price charged in the other two areas. This situation is causing severe profitability problems for the company.

Given this situation, your analysis should be directed toward determining the cash needed for each of the plant decisions to bring about a turnaround in production cost per unit. At the same time you should ensure that the production operations and decisions are consistent with the requirements of the Sales Division. The Sales Division is expected to maximize sales revenue and increase the firm's market share of the industry.



To meet your responsibilities, you should now take the following steps in the order given.

First, you should ensure that you have analyzed the reports thoroughly enough to know the nature of the situation facing the firm. You may have already accomplished this as you read through Packet A. If not, you may take up to fifteen more minutes to analyze the reports in Packet A.

Secondly, the president will convene a meeting with the vice presidents after your analysis is completed. The purpose of the meeting each period is to ensure that everyone knows what the facts of the situation facing the firm are, and to allow the exchange of ideas, suggestions, and alternatives among the individuals in the company. They, the members of the firm jointly decide on the allocation of the available cash and the prices in each area. Thus, you should provide the president and the other vice president with why facts you have determined from your analysis of the reports. In turn, you are likely to receive some new facts from these persons. Similarly, you should exchange ideas, suggestions, and alternatives that the firm might consider as actions for the coming year. This meeting will last about sixty minutes.

Thirdly, at the end of the meeting, you will jointly decide each area decision and plant decision for year 6. To accomplish this, take out the budget form located at the back of this packet. Attached to the form is a glossary of brief descriptions of the effects of each decision. Completely fill out the budget form. That is, you should record on the form what you jointly decide with the other members of the firm as to (1) the area prices and (2) the marketing expenditures in each area and the plant decisions required. The cash allocations to the various functions may add up to but not exceed the \$10,957 available cash balance as of the end of year 5.

Finally, check with the other members of your firm to make sure that your budget forms are filled out the same way. Retain the budget form and hand in Packet A to the president at this time. Upon turning in Packet A, you will receive Packet C as a replacement for Packet A. Upon receipt of Packet C, please open the packet and follow the instructions given inside the packet.

## SPECIAL CHARACTERISTICS OF YOUR FIRM

You are now the newly employed Vice President for Production. Recall that the organization chart of your firm, provided earlier, defines your position as reporting directly to the president.

All of the company's facilities are located in area 2, your home area. The following procedures have been established in your firm as an aid to making the area and plant decisions.

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Secondly, a meeting of all personnel is held. This meeting has proven very useful in the past as a means to accomplish the following: ensuring everyone knows what the facts are in the situation facing the firm; allowing the exchange of ideas, suggestions, and alternatives among individuals concerning the decisions to be made; and reaching a consensus on the decisions to be made among the individuals at the meeting. At the conclusion of the meeting, the budget form (located at the end of this packet) is jointly filled out by the president and the vice presidents.

## YOUR ROLE

As the Vice President for Production, your primary responsibility is to minimize the production costs per unit in both the short run and over the long run. The president has established the overall company goal as the maximizing of profits, and is very concerned with the performance of the Production Division. For example, the unit production cost in year 5 was almost as high as the unit price charged in two areas, and was higher than the unit price charged in the other two areas. This situation is causing severe profitability problems for the company.

Given this situation, your analysis should be directed toward determining the cash needed for each of the plant decisions to bring about a turnaround in production cost per unit. At the same time you should ensure that the production operations and decisions are consistent with the requirements of the Sales Division. The Sales Division is expected to maximize sales revenue and increase the firm's market share of the industry.



To meet your responsibilities, you should now take the following steps in the order given.

First, you should ensure that you have analyzed the reports thoroughly enough to know the nature of the situation facing the firm. You may have already accomplished this as you read through Packet A. If not, you may take up to fifteen more minutes to analyze the reports in Packet A.

Secondly, the president will convene a meeting with the vice presidents after your analysis is completed. The purpose of the meeting each period is to ensure that everyone knows what the facts of the situation facing the firm are, and to allow the exchange of ideas, suggestions, and alternatives among the individuals in the company. Then, the members of the firm jointly decide on the allocation of the available cash and the prices in the area. Thus, you should provide the president and the other vice president with any facts you have determined from your analysis of the reports. In turn, you are likely to receive some new facts from these persons. Similarly, you should exchange ideas, suggestions, and alternatives that the firm might consider as actions for the coming year. This meeting will last about sixty minutes.

Thirdly, at the end of the meeting, you will jointly decide each area decision and plant decision for year 6. To accomplish this, take out the budget form located at the back of this packet. Attached to the form is a glossary of brief descriptions of the effects of each decision. Completely fill out the budget form. That is, you should record on the form what you jointly decide with the other members of the firm as to (1) the area prices and (2) the marketing expenditures in each area and the plant decisions required. The cash allocations to the various functions may add up to but not exceed the \$10,957 available cash balance as of the end of year 5.

Finally, check with the other members of your firm to make sure that your budget forms are filled out the same way. Retain the budget form and hand in Packet A to the president at this time. Upon turning in Packet A, you will receive Packet C as a replacement for Packet A. Upon receipt of Packet C, please open the packet and follow the instructions given inside the packet.

Now that you have submitted your budget recommendation to the president, please wait for a few minutes while the president makes the final decision on the cash allocations and the pricing strategy. While you are waiting, we would appreciate your giving some responses to a few questions. Your responses will be very helpful in determining the effectiveness of the format and content of the reports that were provided in Packet A as decision making aids.

In responding to some of the questions below, you may find your copy of the budget recommendation form useful. Please feel free to refer to it as necessary.

Please do respond to each question. The purpose of these questions is to gather information and what you think is of primary importance for this project. As you respond to these questions, keep in mind the position you hold in the firm, and the responsibilities of that position.

For each question or statement below, circle the letter of the response that you think is most appropriate. Work through the questions as quickly as you can. Remember, what you think is what is most important in answering these questions.

1. The Business Index over the most recent three years has been:

- A. Rising.
- B. Falling.
- C. Staying constant.
- D. Fluctuating up and down.

2. As of the end of year 5, my firm's ranking in the industry in terms of cash on hand for operations is:

- A. First.
- B. Second.
- C. Third.
- D. Cannot recall.

3. As of the end of year 5, my firm's ranking in the industry in terms of plant capacity is:

- A. First.
- B. Second.
- C. Third.
- D. Cannot recall.

4. As of the end of year 5, my firm's ranking in the industry in terms of total assets is:

- A. First.
- B. Second.
- C. Third.
- D. Cannot recall.

5. Over the last five years, my firm's share of the market as a percentage of the total sales made in the industry in each geographical area: (Please make four responses to this statement - one for each area)

	AREA 1	AREA 2	AREA 3	AREA 4
A. Increased.	A	A	A	A
B. Decreased.	B	B	B	B
C. Increased, than varied downward and upward.	C	C	C	C
D. Decreased, than varied upward and downward.	D	D	D	D
E. Cannot recall.	E	E	E	E

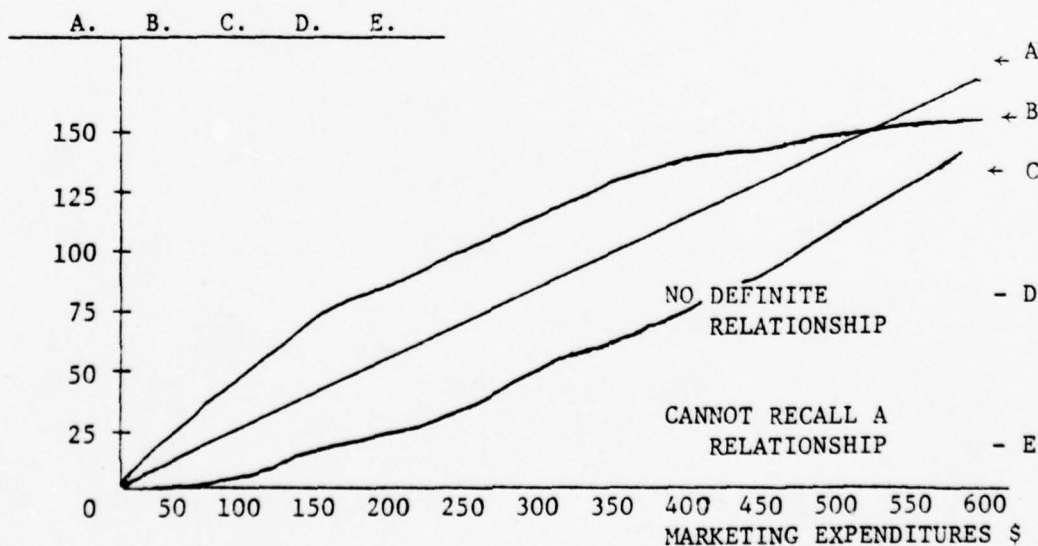
6. Over the last five years, my firm's pricing strategy in an area can best be characterized or described as: (Please make four responses to this statement - one for each area)

- |  | AREA 1 | AREA 2 | AREA 3 | AREA 4 |
|--|--------|--------|--------|--------|
| A. A price leader; for the most part, my firm's prices were higher than those set by the other two firms.    | A      | A      | A      | A      |
| B. A price follower; for the most part, my firm's prices were lower than those set by one or the other firm. | B      | B      | B      | B      |
| C. A price competitor; for the most part, prices charged by each firm were the same.                         | C      | C      | C      | C      |
| D. Cannot recall.  | D      | D      | D      | D      |

7. Delivered cost per unit is the lower in:

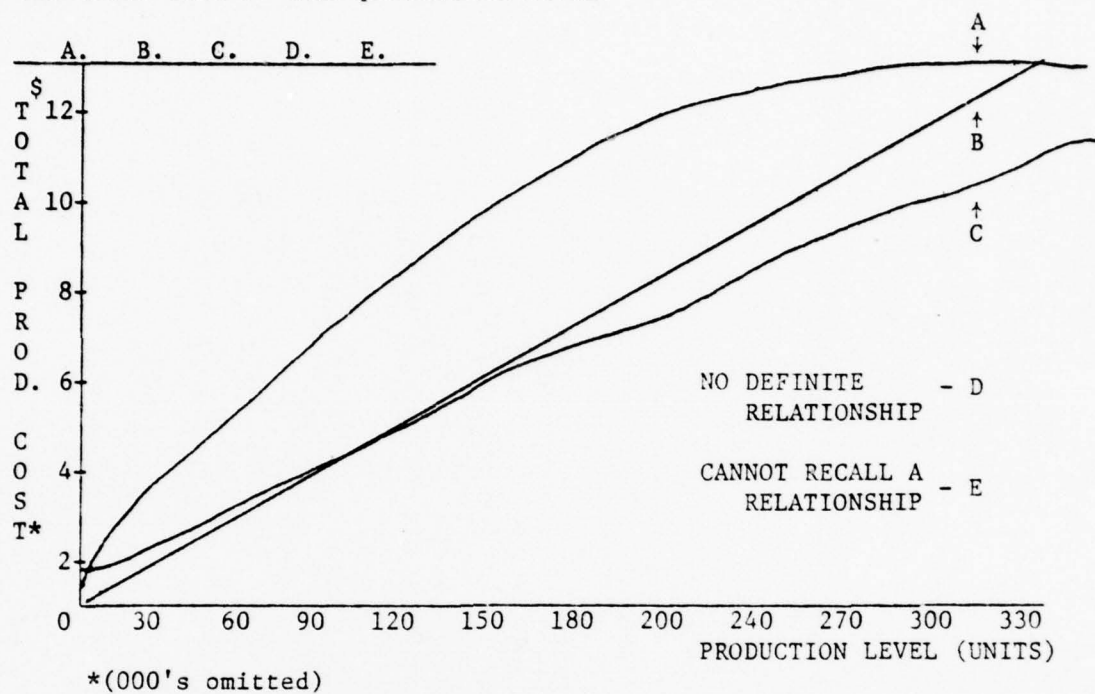
- A. Area 1.
- B. Area 2.
- C. Area 3.
- D. Area 4.
- E. Cannot recall.

8. Which one of the following lines on the graph or phrases best describes the general relationship between marketing expenditures in each area and total units sold in that area?



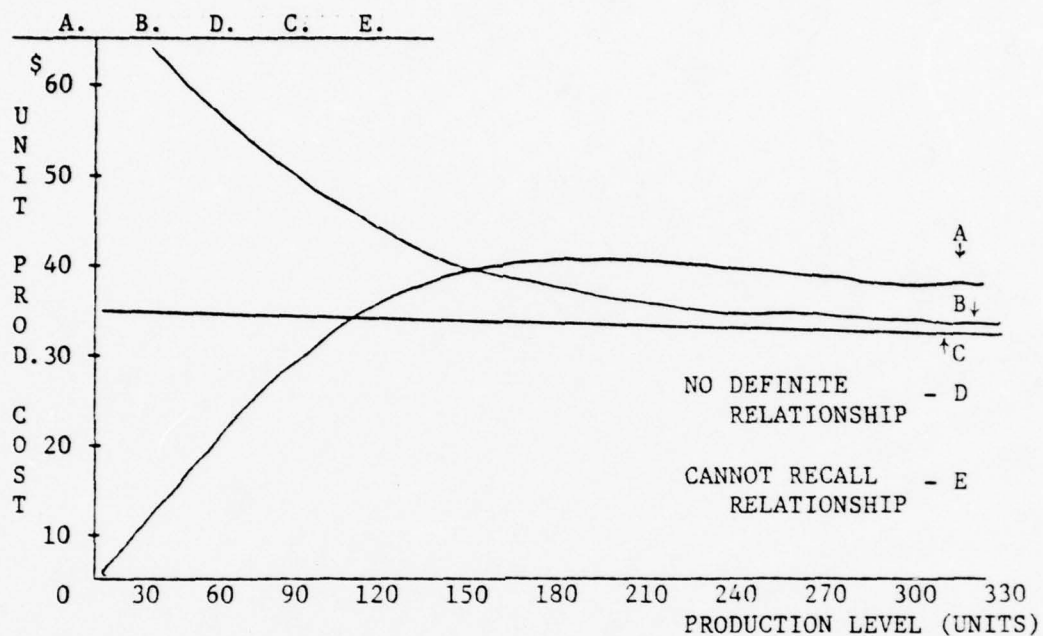


9. Which one of the following lines on the graph or phrases best describes the general relationships between the production level and the total cost of that production level?

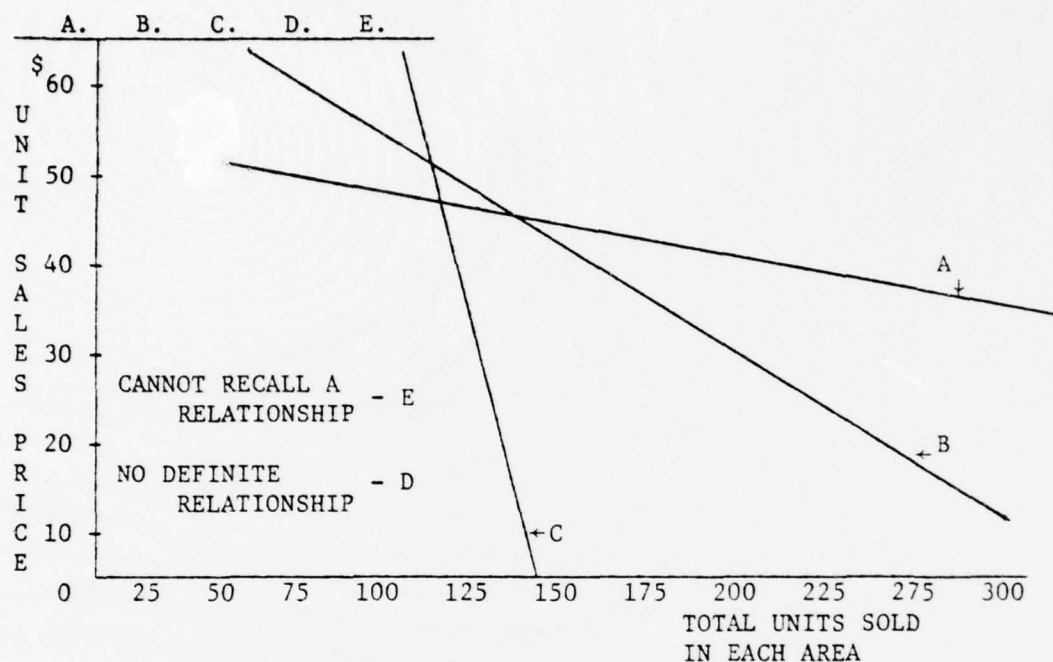




10. Which one of the following lines on the graph or phrases best describes the general relationship between the production level and the unit production cost?



11. Which of the following lines on the graph or phrases best describes the general relationship between units sold in each area and the unit sales price?



12. Over the most recent three years, net profit has:

- A. Increased.
- B. Decreased.
- C. Stayed relatively constant.
- D. Fluctuated widely from year to year.
- E. Cannot recall.

13. Profit per unit is highest in:

- A. Area 1.
- B. Area 2.
- C. Area 3.
- D. Area 4.
- E. Cannot recall.

14. In general, in each of the last five years, most of the available cash has been allocated to:

- A. Marketing.
- B. Production.
- C. Plant Improvement.
- D. Research.
- E. Cannot recall.

15. The other vice president in your firm also submitted a budget recommendation to the president. In the space provided below, estimate what you think the other vice president recommended to the president.

#### AREA DECISIONS

##### UNIT PRICE

AREA 1 \$ \_\_\_\_\_ (Prices should be in dollars only)

AREA 2 \$ \_\_\_\_\_

AREA 3 \$ \_\_\_\_\_

AREA 4 \$ \_\_\_\_\_

##### MARKETING EXPENDITURES

AREA 1 \$ \_\_\_\_\_

AREA 2 \$ \_\_\_\_\_

AREA 3 \$ \_\_\_\_\_

AREA 4 \$ \_\_\_\_\_

A. TOTAL MARKETING \$ \_\_\_\_\_ (Areas 1 - 4)

#### PLANT DECISIONS

B. PRODUCTION \$ \_\_\_\_\_

C. PLANT IMPROVEMENT \$ \_\_\_\_\_

D. RESEARCH \$ \_\_\_\_\_

TOTAL EXPENDITURES (A thru D) \$ \_\_\_\_\_

16. In a few moments, you will receive the final decision the president made on the budget. In the space below, indicate what you think the president will finally decide.

#### AREA DECISIONS

##### UNIT PRICE

AREA 1 \$ \_\_\_\_\_ (Prices should be in dollars only)

AREA 2 \$ \_\_\_\_\_

AREA 3 \$ \_\_\_\_\_

AREA 4 \$ \_\_\_\_\_

##### MARKETING EXPENDITURES

AREA 1 \$ \_\_\_\_\_

AREA 2 \$ \_\_\_\_\_

AREA 3 \$ \_\_\_\_\_

AREA 4 \$ \_\_\_\_\_

A. TOTAL MARKETING \$ \_\_\_\_\_ (Areas 1 - 4)

#### PLANT DECISIONS

B. PRODUCTION \$ \_\_\_\_\_

C. PLANT IMPROVEMENT \$ \_\_\_\_\_

D. RESEARCH \$ \_\_\_\_\_

TOTAL EXPENDITURES (A thru D) \$ \_\_\_\_\_

Question 16 completes Packet C. Please check to make sure that you responded completely to each of the preceding questions. You will receive a copy of the president's final decision along with a final packet, Packet D. Please open Packet D when you receive it and follow the instructions inside to conclude the session for today.

15. Recall that the decisions in your firm were jointly made by the firm members. In the space provided below, indicate what you personally think the decisions should be.

UNIT PRICE

AREA 1 \$ \_\_\_\_\_ (Prices should be in dollars only)

AREA 2 \$ \_\_\_\_\_

AREA 3 \$ \_\_\_\_\_

AREA 4 \$ \_\_\_\_\_

MARKETING

AREA 1 \$ \_\_\_\_\_

AREA 2 \$ \_\_\_\_\_

AREA 3 \$ \_\_\_\_\_

AREA 4 \$ \_\_\_\_\_

TOTAL MARKETING \$ \_\_\_\_\_ (Areas 1 - 4)

PLANT IMPROVEMENT \$ \_\_\_\_\_

PRODUCTION \$ \_\_\_\_\_

RESEARCH \$ \_\_\_\_\_

TOTAL EXPENDITURES \$ \_\_\_\_\_



16. In the space below, indicate what you think the other vice president in your firm personally thinks the decisions should be.

AREA DECISIONS

UNIT PRICE

AREA 1 \$ \_\_\_\_\_

AREA 2 \$ \_\_\_\_\_

AREA 3 \$ \_\_\_\_\_

AREA 4 \$ \_\_\_\_\_

MARKETING

AREA 1 \$ \_\_\_\_\_

AREA 2 \$ \_\_\_\_\_

AREA 3 \$ \_\_\_\_\_

AREA 4 \$ \_\_\_\_\_

TOTAL MARKETING \$ \_\_\_\_\_

PLANT DECISIONS

PRODUCTION \$ \_\_\_\_\_

PLANT IMPROVEMENT \$ \_\_\_\_\_

RESEARCH \$ \_\_\_\_\_

TOTAL AVAILABLE CASH \$ \_\_\_\_\_

17. In the space below, indicate what you think the president of your firm personally thinks the decisions should be.

AREA DECISIONS

UNIT PRICE

AREA 1 \$ \_\_\_\_\_

AREA 2 \$ \_\_\_\_\_

AREA 3 \$ \_\_\_\_\_

AREA 4 \$ \_\_\_\_\_

MARKETING

AREA 1 \$ \_\_\_\_\_

AREA 2 \$ \_\_\_\_\_

AREA 3 \$ \_\_\_\_\_

AREA 4 \$ \_\_\_\_\_

TOTAL MARKETING

\$ \_\_\_\_\_

PLANT DECISIONS

PRODUCTION

\$ \_\_\_\_\_

PLANT IMPROVEMENT

\$ \_\_\_\_\_

RESEARCH

\$ \_\_\_\_\_

TOTAL AVAILABLE CASH

\$ \_\_\_\_\_

The decisions made by the president for year 6 are attached to this sheet. The president of your firm made these plant and area decisions independently - that is, the recommendations of the Vice-president for Sales and the Vice-president for Production were not considered by the president in making these decisions.

## FIRM 2

## BUDGET DECISIONS

FOR YEAR 6

## AREA DECISIONS

## UNIT PRICE

AREA 1 \$ \_\_\_\_\_

AREA 2 \$ \_\_\_\_\_

AREA 3 \$ \_\_\_\_\_

AREA 4 \$ \_\_\_\_\_

## MARKETING

AREA 1 \$ \_\_\_\_\_

AREA 2 \$ \_\_\_\_\_

AREA 3 \$ \_\_\_\_\_

AREA 4 \$ \_\_\_\_\_

TOTAL MARKETING \$ \_\_\_\_\_

## PLANT DECISIONS

PRODUCTION \$ \_\_\_\_\_

PLANT IMPROVEMENT \$ \_\_\_\_\_

RESEARCH \$ \_\_\_\_\_

TOTAL AVAILABLE CASH \$ \_\_\_\_\_

---

 (SIGNATURE)

Along with this packet, you received a copy of the final budget decision as made by the president of your firm. Take a few moments to look over the final decision made. Then, as you recall the specific responsibilities of your position in this firm, please indicate your responses to the three questions below by circling the letter of the response that best describes your feelings about the final decision made.

1. If given the opportunity, to what degree would you now change the cash allocations made and the prices set to meet your responsibilities in this firm.

- A. Not at all.
- B. Very little.
- C. To some degree.
- D. To a considerable degree.
- E. To a very great degree.

2. How satisfied are you with the cash allocations made and the prices set?

- A. Very dissatisfied.
- B. Pretty dissatisfied.
- C. Neither satisfied nor dissatisfied.
- D. Pretty satisfied.
- E. Very satisfied.

3. How much do the decisions on cash allocations and prices as finally made represent the ones that you now believe to be correct?

- A. Basically what I consider correct.
- B. Fairly close to what I consider correct.
- C. Somewhat close to what I consider correct.
- D. Fairly different from what I consider correct.
- E. Very different from what I consider correct.

The next two questions ask you for some background data that may be very useful in analyzing the results of this session.

1. Please list your classification and major field. \_\_\_\_\_

2. Please indicate your cumulative grade point average: \_\_\_\_\_

Instructions for concluding the session are on the next page.



Thank you for your time and effort in participating in this session. We hope that you found the experience an interesting and informative one. We ask that you please not discuss the nature of the session, however, with any of your friends for the next few days. Other persons are scheduled to participate in the project in the next few days, and prior knowledge on their part of the nature of the session would greatly weaken the potential value of the project.

At this time, one of the persons working on this project will compensate you \$5.00 for your participation and will answer any questions you might have. Thank you again.

How much weight or influence do you feel your budget recommendations had on the president's final budget decision? (Please circle the appropriate number).

1  
None

2  
A Little

3  
A Fair  
Amount

4  
A Considerable  
Amount

5  
A Great  
Deal

19. If given the opportunity, to what degree would you now change the jointly determined cash allocations and prices set to meet your responsibilities in this firm?

- A. Not at all.
- B. Very little.
- C. To some degree.
- D. To a considerable degree.
- E. To a very great degree.

20. How satisfied are you with the jointly determined cash allocations and prices set?

- A. Very dissatisfied.
- B. Pretty dissatisfied.
- C. Neither satisfied nor dissatisfied.
- D. Pretty satisfied.
- E. Very satisfied.

21. How much do the jointly determined decisions on cash allocations and prices represent the ones that you now believe to be correct?

- A. Basically what I consider correct.
- B. Fairly close to what I consider correct.
- C. Somewhat close to what I consider correct.
- D. Fairly different from what I consider correct.
- E. Very different from what I consider correct.

22. How much say or influence did you have on the final decisions made.

- A. None.
- B. Some, but not as much as the other persons.
- C. About the same as the other persons.
- D. Somewhat more than the other persons.
- E. A lot more than the other persons.

The next two questions ask you for some background data that may be very useful in analyzing the results of this session.

1. Please list your classification and major field: \_\_\_\_\_

2. Please indicate your cumulative grade point average: \_\_\_\_\_

Instructions for concluding the session are on the next page.

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